The 3D Art & Design Book™

The ultimate guide to getting the most out of your 3D projects

Inside
- Photoshop
- 3ds Max
- Maya
- Cinema 4D
- ZBrush

Characters • Vehicles • Arch vis • Design • 3D type

Welcome to

The 3D Art & Design Book™

The world of 3D art and design is an exciting place to express your creativity and achieve incredible effects. Whether you're an experienced 3D artist or just getting started, this book contains over 250 pages worth of features, interviews and tutorials from which you can take inspiration and develop your own creations. From characters and vehicles to arch-vis and design, these expert guides cover the most popular tools and software to help enhance your works of art. There are also masterclasses and a helpdesk to answer commonly asked questions about techniques and skills. And if that wasn't enough, there is also a free CD packed full of tutorial files, reference images and over three hours worth of video tuition.

Enjoy the book

The 3D Art & Design Book

Imagine Publishing Ltd
Richmond House
33 Richmond Hill
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Dorset BH2 6EZ
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Editor in Chief
Jo Cole

Production Editor
Sarah Harrison

Senior Art Editor
Danielle Dixon

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IMAGINE PUBLISHING

TEAM OF THE YEAR BOOKAZINES

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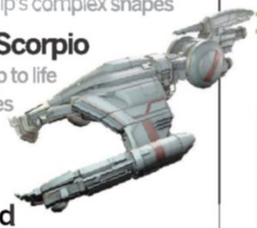

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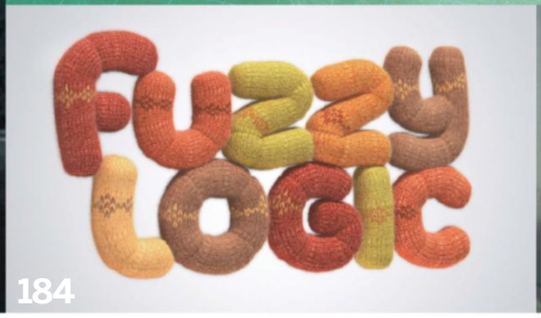

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Ultimate guide to 3D Art & Design

© Maurice Panisch | www.maurice-panisch.de
Model: Glen Johnson, www.glenjohnson.de
Backplate and HDRI: Markus Hanke, www.markushanke.de

Software guide

3ds Max

As part of Autodesk's portfolio of programs, 3ds Max offers game developers, visual effects artists and graphic designers the chance to model, animate, composite and render in its software.

Mudbox
Mudbox is a digital sculpting and painting program from Autodesk. It's available for Mac, Windows and Linux operating systems.

ZBrush

ZBrush is a digital sculpting and painting program. It's used by many artists in a variety of industries, such as films, games, jewellery, toy design and many more.

modo

Luxology's modo has a wide range of users. Everyone from photographers to graphic designers can model, rig, animate, texture, paint and more in this software.

© Rafael Grassetti

Ultimate guide to 3D Art & Design

Whether you're a full-time artist or a hobbyist keen to take the leap into the third dimension, 3D software offers a world of possibilities for creativity. It doesn't matter if it's photo-realistic or stylised models, assets for animation and videogames or visual effects; all this and more can be produced with off-the-shelf 3D applications.

What's more, these programs have never been as accessible to artists. Gone are the days of needing a science degree in order to navigate the interface or a sizeable salary to finance this art form – there are 3D applications out there to suit any budget, and the companies behind the software are working hard to make them more intuitive for their users with every iteration.

For those of you that haven't yet settled on software, you'll find a round-up of ten applications below. While the list is by no means exhaustive, it nonetheless does provide you with an indication of what's out there in order to get you started in the world of 3D. Since the choice of software largely depends on what it is you would like to achieve within it, as well as your system setup, it's worth taking some time to explore your options. Many companies also offer free trials through their websites, which is ideal if you would like to explore a little more before you invest.

> "Gone are the days of needing a science degree or a sizeable salary in order to use this art form"

Maya

Another Autodesk product, Maya offers tools such as animation, modelling, rendering and visual effects. It's also used by creatives working in the game development, visual effects and graphic design industries.

Cinema 4D

Maxon's 3D software is popular among graphic and industrial designers, and is used by many artists to model, animate, light, render and more.

SoftImage

This is a visual effects, animation and 3D game development software from Autodesk. It is available as part of the Suite, or as a standalone product.

Blender

This free, open-source software is a fantastic resource for artists. You can model, shade, animate, render and composite in this software.

LightWave

LightWave is another modelling, animation and rendering tool used by artists working in the visual effects and videogames industry.

Vue

E-on software's landscape-generation tool gives artists the chance to create, animate and render realistic environments.

Character

> Character art can cover anything from photo-realistic representations to futuristic robots

Character design is an incredibly broad and exciting genre of 3D art and design. Commercially, character creations feature in industries such as videogames, visual effects, films and advertising. However, outside of those areas, artists use character art to expand their portfolio and develop their skills in other areas of 3D. For many, this can include attempting hair or fur on a critter they've designed, achieving realistic-looking skin on a portrait or applying a photographic finish via the post-production stage.

In terms of what character art encompasses as a category, it can cover anything from photo-realistic representations of your loved ones, organically sculpted monsters of the deep, futuristic robots – pretty much anything you set your mind to.

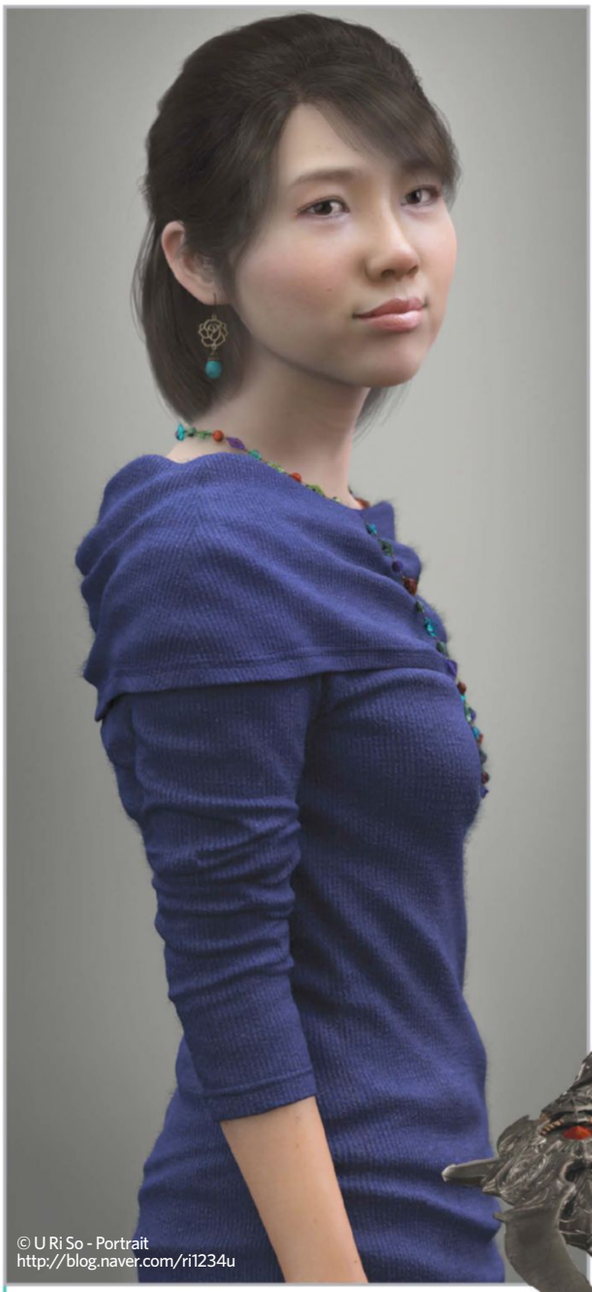
While big-name studios such as Pixar, DreamWorks and Blue Sky Studios are a massive influence on many individuals, artists source inspiration for their projects from all kinds of mediums; films, videogames and even childhood memories can shape a character concept. What's more, studying the world around you can also produce some interesting results; it could mean faithfully re-creating a realistic green lizard or devising an evolutionary answer to the extinct Dodo.

Although working from your own original concepts is certainly advised, collaborating on projects with fellow creatives such as 2D artists can open up a world of opportunities for the 3D artist. It offers a chance to add your own spin on an existing character with a back story, personality and so on. Seek permission from the original artist and/or copyright own beforehand, though.

There are many benefits of working in 3D, but in terms of character creation it enables you to consider a complete view of your character, varying the poses, lighting, materials and rendering. You also need to consider its end use – will it be in a videogame, animation or an illustration? These factors will all impact your workflow at some point and influence the finished piece.

Like workflows, artistic styles vary in character design. For example, you could create something that looks handmade, such as clay, plasticine, wood, or paper mache. Digital sculpting programs, such as ZBrush, Mudbox and Sculptris, also enable artists to create organic creatures with ease.

There are many different ways to complete a character project. Whether you're creating a creature from your own 2D concept, speed-sculpting an idea in ZBrush using its DynaMesh feature or freestyling in 3D straight away, the only limit is your imagination.



© U Ri So - Portrait
http://blog.naver.com/ri1234u

© Rafael Grassetti - Guardian www.grassettiart.com

Photo-realistic portraits

Often regarded as the holy grail of 3D, photorealistic portraits are very difficult to master, but are highly revered in the community. Achieving an accurate pose, features, lighting and more is no easy task, but when done correctly the results can challenge even some photographs. While time and dedication is needed, it should certainly not put you off trying. Use plenty of reference images, and seek feedback from your peers around you and online.

Unique concepts with realistic textures and materials

There's nothing better than coming up with your own creature design and providing it with a real-life setting. Consider its back story and attire, and create a realistic environment to place it in. How big is it compared to others around it? Does it prefer cold or warmer climes? Is it a fighter, a protector, or both? Fleshing out your character's personality will in turn affect its appearance and make the whole thing more believable.

© Richard Yot www.itchyanimation.com

Handmade characters

Producing creations that look like they've been made from wood, paper mache or plasticine can really add style. Artists such as Richard Yot and Matthieu Roussel excel at this, with their work looking both authentically handcrafted and original. Keeping concepts loose and exploring a variety of touches can challenge your skills. The artwork can be used in everything from illustrations to stop-motion animations and 3D comic-books.

Organic creatures

Due to the enhancements in sculpting software such as ZBrush and its DynaMesh feature, it has never been easier to come up with your own concepts. Simply sculpt away digitally to come up with a character that others will have never even dreamed of. Meanwhile, its baby brother Sculptris offers sculpting at no cost to the artist. Granted, it doesn't boast the toolset of others in the market, but it's great for getting you started.

© Brett Patrick Sinclair - Arella
http://brettsinclair3d.blogspot.com

Vinyl toy design

As mentioned, 3D software enables artists to realise their own creations digitally. However, 3D printing now means that these little critters can become a reality. Much of the software to ensure a water-tight print is free and open-source, and the printers themselves are also becoming much more affordable. Check out sites such as Shapeways (www.shapeways.com), MakerBot (www.makerbot.com) and RepRap (www.reprap.org) for more.

© Cesc Grane
www.ceskills.com

> "Producing creations that look like they've been made with wood, paper mache or plasticine can really add style"

Carlos Ortega – May Gift
© Carlos Ortega – stroggtank.cgsociety.org

Vehicle

> 3D art is the perfect outlet for creating a virtual garage of beautiful cars

Vehicle design spans multiple industries, such as videogames, visual effects, films, advertising and industrial design, to name but a few. While some artists strive to achieve photo-realism in their work by perfectly recreating their favourite model of a car or plane, others would perhaps prefer to pursue a more stylised result.

For some, it's a case of reproducing these creations down to the very last nut and bolt as a true test. Taking the time out to render parts that are not seen certainly requires dedication, but it also provides greater flexibility when it comes to your final composition. You can then go on to provide 'close-ups' of areas of interest if you wish – these assets can then be re-used on future projects.

3D art is the perfect outlet for creating a virtual garage of beautiful cars that would cost a fortune to accrue in real life. However, on the commercial side of things, re-creating a set of vintage cars in your program of choice would save you large amounts of cash tracking down vehicles in good condition, getting them to one location and shooting all the angles you need. What's more, by creating a studio lighting setup, you can streamline your workflow and ensure that a consistent approach is taken to each model.

For those not seeking a photo-realistic approach to vehicle design, heading down the stylised route offers up a wealth of opportunities. Not only is the design and construction itself fun to pursue, but the results can be great for illustrations, 3D comics, animations, apparel design and more.

Another popular vehicular style for exploration is spacecraft and space vehicles. If you're a sci-fi fan influenced by blockbuster movies, cartoons and graphic novels, then you might find it exciting to devise something that's equipped for intergalactic travel. The design itself could be inspired by everyday life, such as animals and factory machinery, and exploring other interests outside the studio can make for some interesting design choices. Whether you decide to combine these ideas in 2D first, or head straight into 3D, consider its function as a finished piece and who it'll be used by to ensure your creation is believable.

You don't have to send your creation into outer space, however. Designing custom modes of transport – even for the here and now – can be a fun way to push the boundaries of concept design. Improving a train's design, solving overcrowding issues, devising an eco-friendly plane – you never know, these solutions to everyday transport problems could work their way into daily life!

Once you've designed your vehicle and considered its uses, placing it into an environment or a scene could really be the icing on the cake. Save time by compositing the model into a photograph or your own matte painting, or create the whole 3D scene from scratch – it's a great way to test your lighting and post-production skills outside of hard-surface modelling and vehicle design.

© André Kutscherauer - Audi R8
www.ak3d.de

Photo-real vehicles

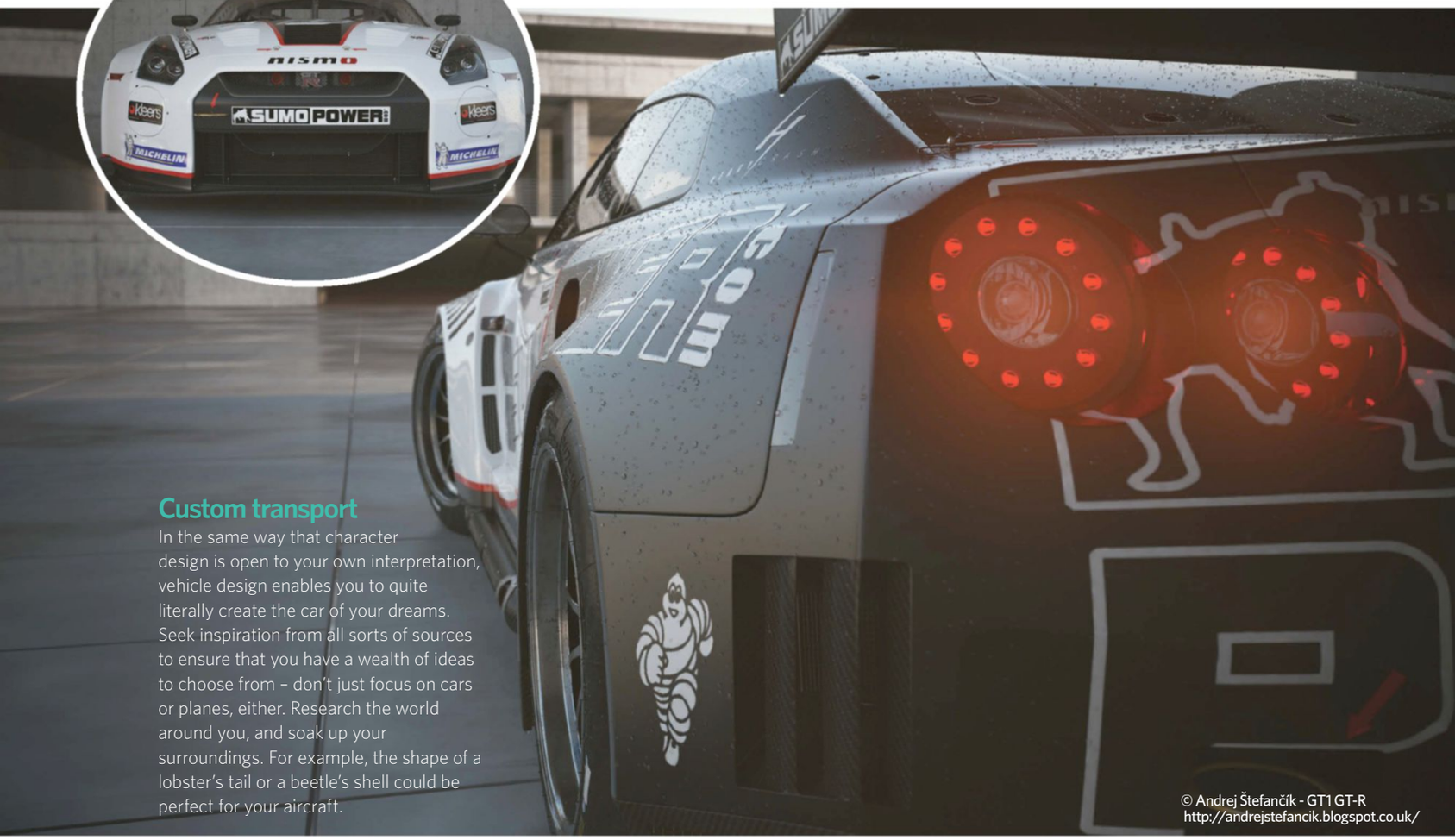
Photo-realism – in any form – is an incredibly difficult thing to master. When it comes to vehicles, it involves all sorts of considerations to make about size, scale, materials and reflections – after all, it's the little details that count. Not only that, it's often necessary to add in imperfections during the post-production stage to ensure that it fits with real-life expectations. When done well, an accompanying wireframe is the only way to tell whether it's real or a photograph.

© Alex Novitskiy
http://3dartistonline.com/user/tigersfather

Spaceships

While many artists love to use 3D art as an outlet for re-creating spacecraft from their favourite film franchises, it's often very rewarding (and more challenging) to draft up a concept for your own design. Think up a back story for your vehicle, and specify its uses – this will help determine the size, scale and materials that it will possess in 3D. It will also save you time later on down the line, and structure your design choices.

© Giannini Creative
www.gianninicreative.com



Custom transport

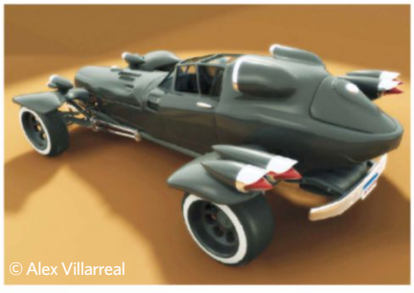
In the same way that character design is open to your own interpretation, vehicle design enables you to quite literally create the car of your dreams. Seek inspiration from all sorts of sources to ensure that you have a wealth of ideas to choose from – don't just focus on cars or planes, either. Research the world around you, and soak up your surroundings. For example, the shape of a lobster's tail or a beetle's shell could be perfect for your aircraft.

© Andrej Štefančík - GT1 GT-R
http://andrejstefancik.blogspot.co.uk/

© Gustavo Groppo - Once Upon A Time
http://gu.cgsociety.org/gallery/

Stylised creations

Allow yourself a bit of artistic licence. Moving away from photo-real representations enables creativity and ideas to flow more freely. Whether it's a Pixar-inspired train, a spaceship or your very own car, putting your own spin presents a unique set of challenges. Why not sculpt the exterior of your transportation in ZBrush to produce an interesting, original shape?



© Alex Villarreal

Setting a scene

To create a believable vehicle, many artists will go to the trouble of building the whole environment surrounding the mode of transport. This could be done with existing assets, or by purchasing models or building the whole thing from scratch. For some, placing their pride and joy in a desert or urban environ helps to add realism and context. It also encourages artists to explore sculpting skills, as well as hard-surface modelling techniques.

Arch-vis

> On a professional level, arch-vis can be used in anything from videogames to advertising and the housing industry

Architectural visualisation, or 'arch-vis' as it is more commonly known, is a global industry. Artists and companies all over the world work to reproduce and/or recreate architects' visions in 3D. On a professional level, arch-vis can be used in anything from videogames to advertising and the housing industry, as well as everything else in between.

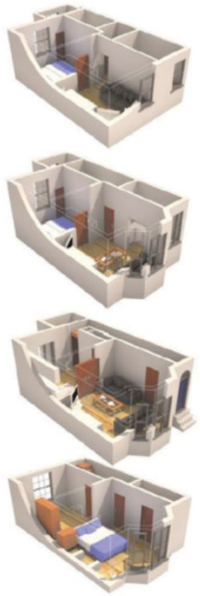
Even for those outside of these industries, arch-vis as an art form offers some great challenges (and even greater rewards) to 3D artists. Becoming aware of size and scale, lighting, different materials and practicality of design can assist you in other projects. What's more, much like vehicle or character design, you can be as creative as you wish when it comes to your own designs. Is it a post-war street or a brand new housing development you're trying to create? With the capabilities of modern-day 3D software, you can make pretty much anything you wish.

If acute detail is what you seek, then photo-realistic arch-vis represents a fantastic way of challenging yourself. A good knowledge of traditional art forms, such as colour theory, lighting and photography, will serve you well. In fact, employing some photographic techniques into your scene, such as depth of field, framing and composition can ensure that your viewers will find it tricky to work out if the images are real or rendered.

As you would expect, this doesn't just apply to the exterior of a building, either. Interior arch-vis scenes are a really good way of presenting the property as it would be used, be this as living accommodation, a working studio and so on. The variety of materials featured in these environments can be staggering, and an excellent test to recreate in 3D. Nevertheless, assets and models can be re-used in later projects, which will save you time and money.

When you have modelled your building, going on to create its surrounding environment can really help put it into context for the viewer and communicate the back story without words. There's no need to model every blade of grass, either, as landscape-generation tools such as Vue, as well as plug-ins for general 3D software, enable you to save time by scattering foliage in all the right places to populate your scene. Ensure that you're on the lookout for repeated trees and bushes, though, as the viewers will pick them up in an instant. Use your post-production skills to ensure that you put your own stamp on the final scene.

If you're working on a commercial project, 3D floorplans can be a great way of displaying the architect's original drawings. You can add textures, furnishings, lighting and change camera angles to suit your purpose. What's more, to add another twist, devising a cutaway of the property enables you to display both the floorplan and the proposed building, giving your client the best of both worlds.



© Paul Hatton www.cadesignservices.co.uk

Exterior environments

For many artists, creating the architecture is only part of the task. Placing it into the environment helps to add both context and realism to the structure. Communicating these ideas to the client in the first instance could make the difference between them selling the idea or not. Producing additional elements such as foliage, snow or streetlights, also adds to your skillset as an artist.

© Pawel Podwojewski – http://www.motyw.org/
Single House © Pawel Podwojewski – http://www.motyw.org/

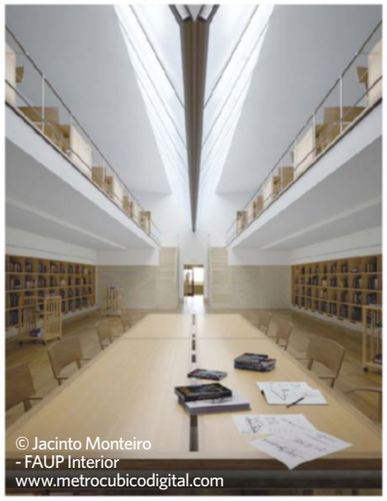
Cutaways

Often used in the housing industry to illustrate the interior and exterior of a new development, cutaways can help to put the design into context for the viewer. While these were traditionally created in 2D software, producing them in 3D means that no only can you create something truly realistic; if necessary, you can also re-use assets for other angles and projects.

Artist: Paul Hatton
http://www.cadesignservices.co.uk/

3D floorplans

What once started out as accurate line drawings have evolved into vector illustrations and, more recently, 3D representations of the design process. These images are key in the housing and arch-vis industry, since they illustrate a property's layout. Usually working from an architect's drawing, the artist will recreate this using their choice of software, the benefit being that realistic textures, materials, lighting and so on can be used.



© Jacinto Monteiro
- FAUP Interior
www.metrocubicodigital.com

Photo-realistic

Producing images that rival real life is the ultimate goal for many artists. The benefits of creating these for arch-vis in a commercial sense is that they can provide a realistic view of the proposed development without the need for setting up a photoshoot. Furnishings, composition, lighting, colour schemes and more can be changed, ultimately saving time and money over conventional methods.

© Iain Collins – Art Studio
http://iainc.carbonmade.com

Chair © Antoine Desjardins
http://www.coroflot.com/antoined

Interior scenes

Rooms of a building can really present some exciting challenges to the 3D artist. There's the textures and materials present, such as soft furnishings, tiled floors, granite worktops and more. Then there's the lighting – what time of day has this been shot at, and where are the light sources? Don't forget to employ photographic techniques such as depth of field to add the finishing touches to a scene.

Design

> Abstract art and typography encompasses the more graphic design elements

The 'design' section of this book includes guidance on achieving abstract artwork or typographical compositions using 3D software. While character, vehicle and architectural design is a large part of 3D, abstract art and typography encompasses the more graphic design elements and can be used in motion graphics, branding, advertising, standalone illustrations, and to boost a personal portfolio.

Abstract hard surfaces, much like real-life sculpts, offer the opportunity to explore and reproduce artistic expression. It doesn't matter which program you create them in, and it helps you explore the toolset to later apply this knowledge to future projects. Once your abstract piece is completed, these can then be composited into photographs, matte paintings or in a studio setup. The results can also inspire future character design, 3D-printed sculpts, vehicle designs and more.

Organic abstract sculpts, meanwhile, can also take shape in any software, but applications such as ZBrush, Sculptris, RealFlow and XenoDream can produce interesting, fluid results.

Typography presents a slightly more structured method of design, since what you're working with is letters, and they have to present certain key elements. What's great about working with typography in 3D software, though, is that you can consider all angles of whatever it is you're creating. Change the materials, lighting, composition and character angles to whatever you see fit – you can also explore new ways of representing the letters for your clients. There's no doubt that 2D typography will never lose its charm, but 3D typography can then go on to be animated, destroyed, or placed alongside 3D rendered product shots. It can help bring a brand or logo to life.

Utilising the animation tools in Cinema 4D, After Effects or your software of choice will teach you the fundamentals of motion graphics, which you can later apply to other projects or expand on these to produce longer, more detailed animations.

Digital graffiti is another great way of exploring 3D design. Like digital sculpting, graffiti offers all of the creativity with none of the mess. You can team it with a variety of textures and materials to produce some great effects, making it ideal for desktop backgrounds, apparel design, prints and more. Much like abstract sculpts, it would also look good composited into a photograph or scene to provide context and contrast with its surroundings.

Whether it's abstract artwork, graffiti or typography you're interested in, you can seek out inspiration for your designs from a number of different sources. Track down hidden graffiti on walls, trains and in exhibitions, study how fellow graphic designers produce their work, and then embark on your own approach. Consider how the choice of material, lighting or scene can alter the scene, too – it will improve your 3D skills, and also give you greater flexibility over the final result.

Organic abstract sculpts

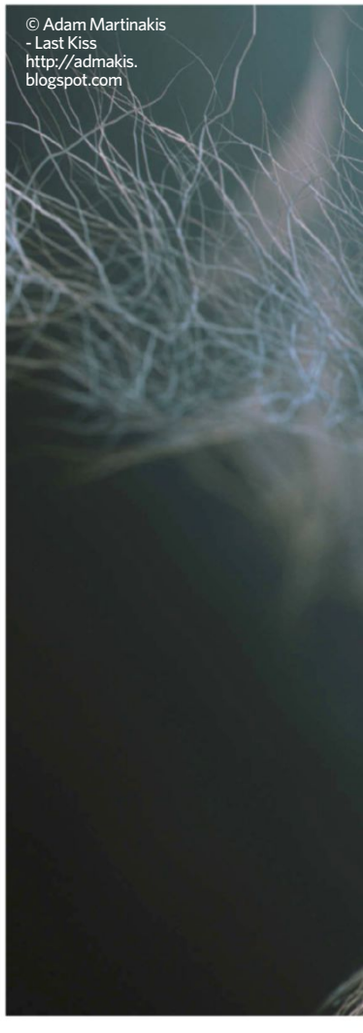
Experimenting with organic abstract sculpts in any 3D software can be truly liberating for many artists. Playing with clay, albeit digital, means no mess and the chance to create 'happy accidents', mistakes you may not have made if you were sticking to a strict workflow, which could benefit the project in the long term. This freedom enables interesting and unique results.

© Lee Griggs - Diatom Motion
www.leegriggs.com

© Billy Bogiatzoglou aka Billelis http://billelis.prosite.com

Animated typography

Creating shorts and/or idents is a great way to explore different angles of typography. Artists often use software such as Cinema 4D and After Effects to create these short animated clips, which can then be used for everything for adverts, TV channels or simply as a personal project to boost a portfolio. What's more, they can be used in conjunction with particle or destruction effects to produce an interesting outcome.



© Adam Martinakis - Last Kiss http://admakis.blogspot.com

Abstract hard-surface design

Modelling abstract hard surfaces offers the chance to produce something that's original and experimental. Give an inanimate object personality, or just see where your mind takes you. Composite it into a photograph, and apply textures or vector elements – exploring digital art applications can produce some great outcomes.

3D graffiti

Digital graffiti is an exciting diversion from traditional typography, enabling users to explore possible structures and shapes with words and abstract elements. Additionally, you can attribute new textures, interesting lighting and tweak camera angles to produce different results. What's more, you could also composite the 3D graffiti into a photograph to add context and realism.

Typography

Whether it's creating a company logo, famous quote or your own name, 3D software can really help to transform text into a piece of practical art. Once made, you can re-use this asset in a number of ways, revamping the results by using different textures, materials and lighting every time. Woolen type? Why not?! When placed alongside relevant, fast-selling consumer goods, you've got one eye-catching advert.

Character

Master the essential art of the human form

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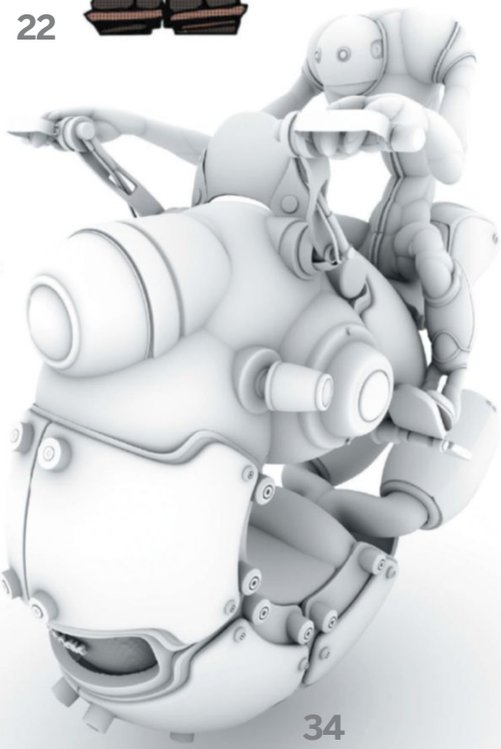
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> A playful, sexy character combining burlesque aesthetics with 3D modelling
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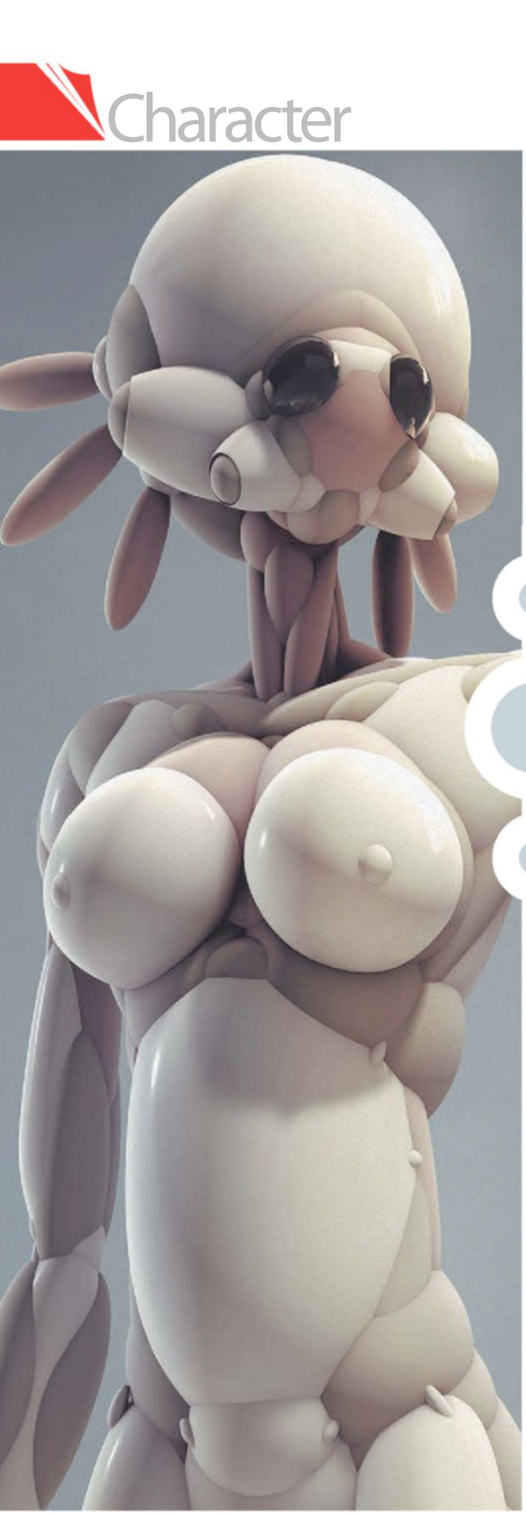
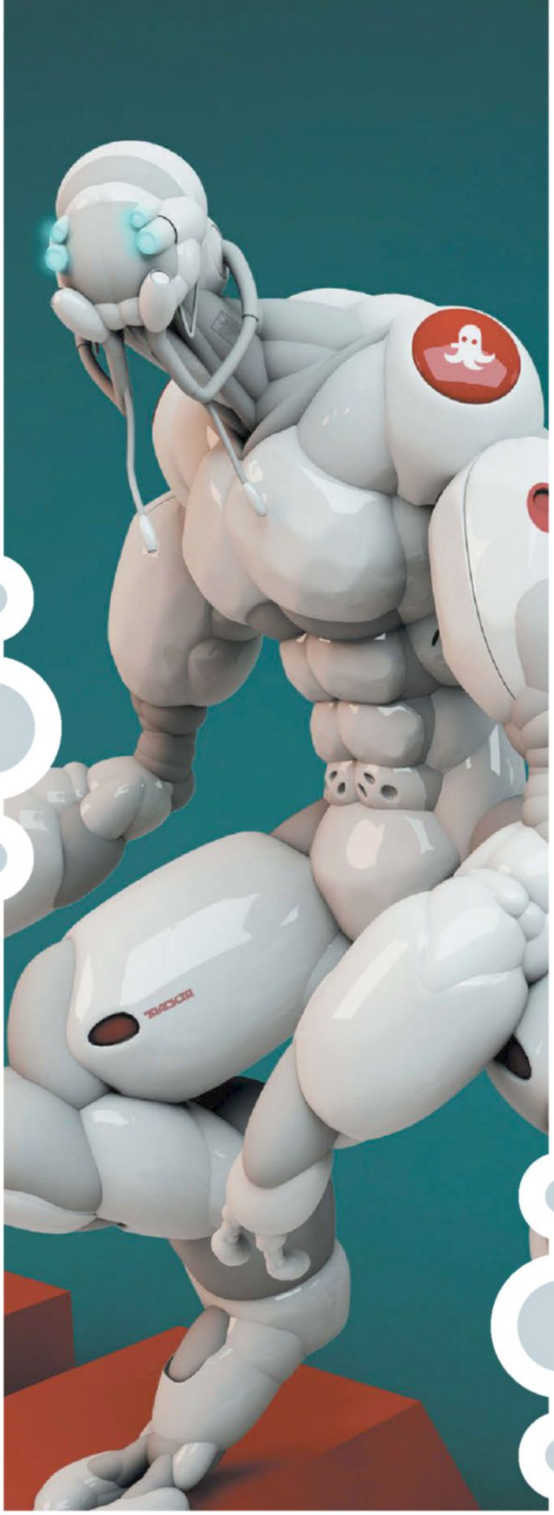
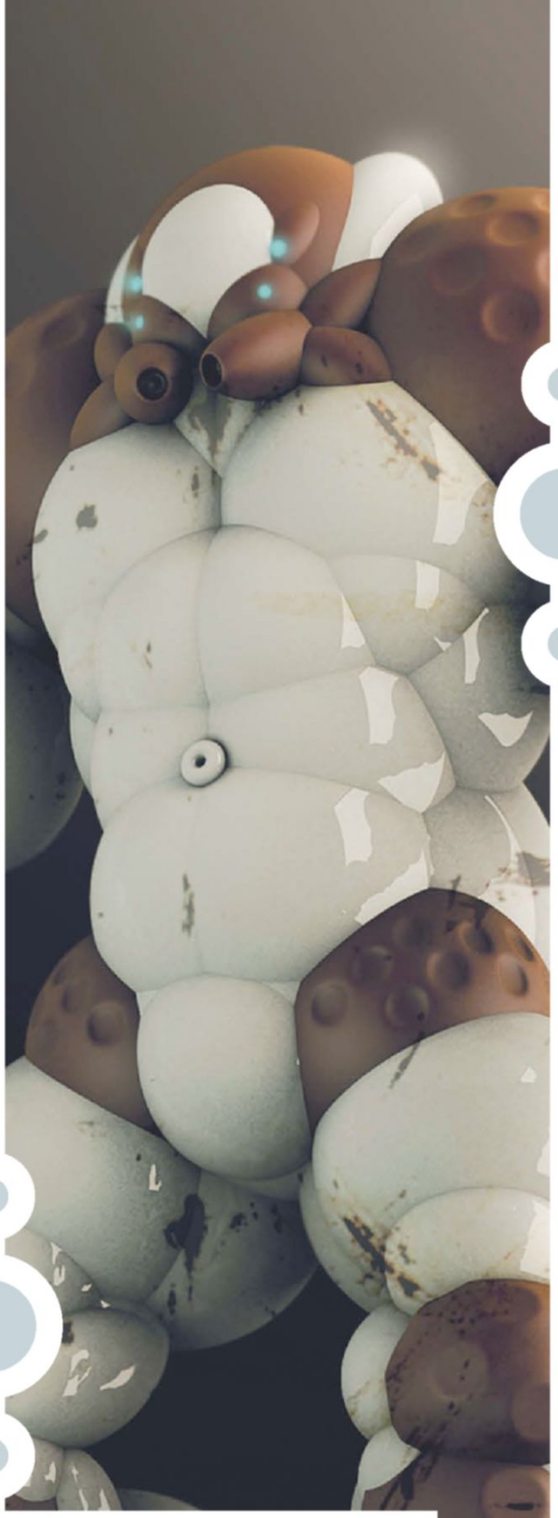






Distinctive design

Olivier Bucheron aka **Zamak** speaks about the character inspirations and workflow behind the eccentric designs that he has become so well known for

Translated by **Quentin Hugo Bernard**

Olivier Bucheron's special interest in 3D began early in 2000, when he graduated from art school in France and took the pseudonym Zamak. He quickly widened his technical abilities and has increasingly brought 3D elements into his work ever since, always enriching the scope of his artistic inspirations.

Throughout his young but promising career, not only has he been interested in the fields of 3D and animation, but also in photography, fine art, advertising, fashion and design in general. So far, his professional experiences and personal productions have been varied. Working in everything from print projects to animation commissions, he has co-founded the sportswear brand Stone Edge, has been artistic director for the accessory brand Arthur & Aston and is now a designer in Paris. Recently, he has generated collaborations with worldwide companies such as Peugeot and Nike, and among his forthcoming projects a full 3D short movie and a videogame character design commission are worth a mention.

Now instantly recognisable for the style of his fun and quirky robots, Zamak pays very careful attention to details and is extremely demanding when it comes to the quality and realism of the textures and materials used in his designs. Zamak will now take us through his artistic approach, discussing the key considerations that should be kept in mind when modelling, while also providing some useful tips along the way. Starting by highlighting the often unexpected and widely varied inspirations that drive Zamak to concept and model new characters, we'll see his work in context as we explore how he aims to capture a certain essence of reality. Continuing with an insight into the techniques he uses for his unique character creations, we are given a fascinating overview of the dedication it takes to develop your own style.

Name
Olivier Bucheron (Zamak)

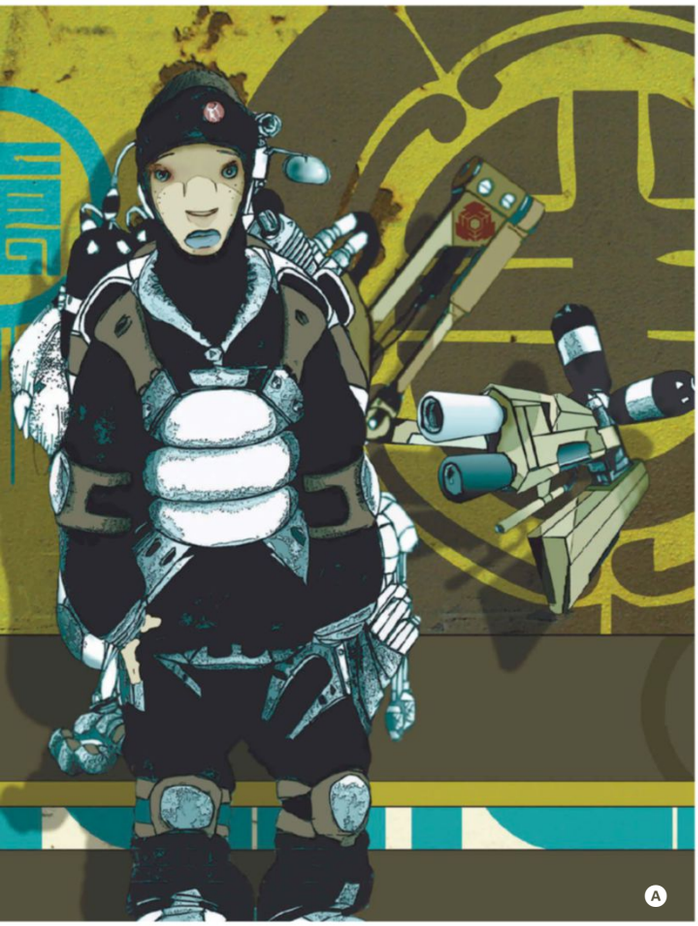
Company website
http://zamak.fr

Location France

Expertise Design

Software CINEMA 4D, After Effects, Photoshop

Client list
Peugeot, Nike, Float Hybrid Entertainment and more



A

B

Concepting for 3D characters

C

D

E

F

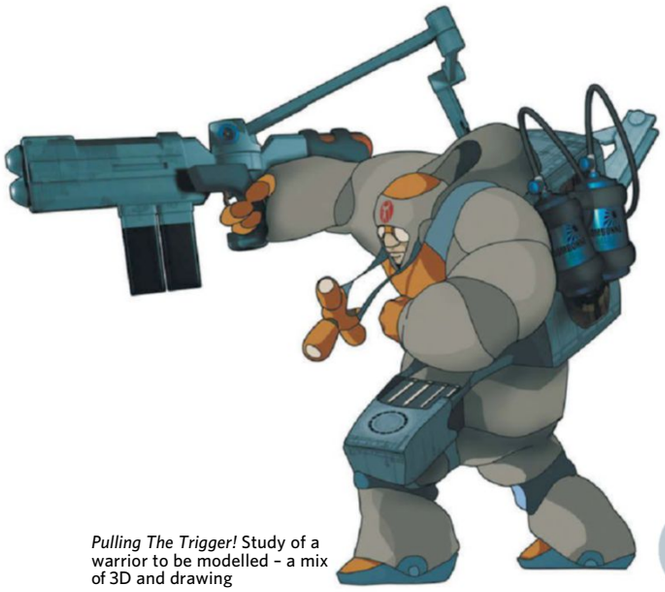
> Inevitably, there is an element of improvisation when starting to model. The number of possibilities is infinite!

When starting a new character in 3D, the process is much the same as it would be for any object you want to create. One constant, for me, is that I'm always influenced by something that – first and foremost – catches my eye. To begin with, I have no idea what it will become in the end; I generally see a particular aesthetic that rings a bell in my head, and the inspiration feeds the process of re-imagining it in 3D.

My sources of inspiration are quite wide-ranging: some are very common and relate to my professional activity as a designer, keeping on top of what's currently cutting edge and popular in the field of design. And then, of course, part of my inspiration comes from the more everyday experience, for instance, what I see in TV commercials, or increasingly from things I check out on the internet. In fact, I'd say the majority of my influences come from unexpected sources that have no direct link to my industry.

As strange as it might seem, I would have to say that one of my major sources of inspiration comes in the form of music. I find music artistically stimulating, so when I discover a song or composition that I particularly like, I'm often driven to visually express it. In my opinion, a musical aesthetic can be an excellent starting point. I'm also very sensitive to the music that's used in movies; I really believe that an animation will struggle without sound – that's why I put a premium on the music of my clips, and add soundtracks to my movies with great care.

I'm also influenced by what I see and feel while travelling. For example, when I had an opportunity to go to China, it was impossible *not* to be amazed by the unique atmosphere and aesthetics of the country. As a result, it shattered my personal 'graphic codes' – those of a Western artist – and contributed to enriching my style. Sometimes the phenomenon is not completely conscious, though. Thinking



Pulling The Trigger! Study of a warrior to be modelled – a mix of 3D and drawing

back to a journey to the hospital that I experienced a couple of years ago, that might have influenced me as well. The cold and minimalist aesthetic of my design is likely to have taken inspiration from the sterile atmosphere of clinics.

More generally, however, I would say that I am greatly motivated by human morphology. I like to study action pictures of sport events, as this gives me raw material that is very useful for re-creating the human body. The way that athletes move also gives me ideas when making cinematics. And in my everyday life, when taking the train, I have got into the habit of observing the other passengers. I always find it interesting to focus on their attitude, their posture and to try to reproduce part of that in my designs. Whether it's a very elegant pose or an unusual attitude, it can all be good material. This reference is used in most of my characters' poses – some people may even be able to recognise themselves in my work!

In the early stages, the shapes of the character don't really matter to me. The idea is to simply reproduce the essence of a real-life mood/attribute that I can make a connection with. I especially like to deal with the effect of the Earth's gravitational pull on the living body, whether it's trying to convey an idea of vitality or, on the contrary, portraying limpness. However, this stage is always rather empirical. Any inspiration is enough to drive me to my computer to start work, even if I have absolutely no idea what it will result in. Here and there, I will draw little sketches to a limited degree of detail, as it helps me to pinpoint the base of the character.

My main concern is to convey a particular personality. I strive hard to express this by creating as much realism in the attitude of my characters as I can. To bring a psychological dimension to my characters through believable expressions and postures is very important in order to make sure the model works cohesively within the narrative. For me, it's always integral for my creations to convey a story.

Key project

This character was mainly inspired by the monster in the film *Pan's Labyrinth*. I remember trying hard to focus on the render of the skin; my concern was to achieve a creature whose skin would be pallid – it was important to make it translucent so his veins would show through. I also wanted the character to have glassy eyes – but to not look too dreadful. Mixing ugliness and repulsiveness with fun features, I was able to give him a more friendly appearance. This is why, as a final touch, I added this ridiculous posture with disproportionate arms limping on the ground. I must confess that to create the render of the skin I eventually used the grain of pictures from my wife's knees and elbows!

> "The circle is the staple of my characters. Most of them are exclusively made out of this shape. From one character to another, it has become my signature"

A *Régis*. Study for the realisation of a 3D model. Colours and background have been added in a second shot

B *Le Moment Propice*. Study of a warrior to be realised in 3D: first pencil-drawn and then coloured. The character is on patrol, hence its name, which means 'The Right Moment'

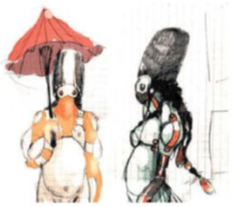
C *Untitled*. Drawing of a radio navigator, coloured in Photoshop

D *Crouching Warrior*. Ink drawing, coloured in Photoshop

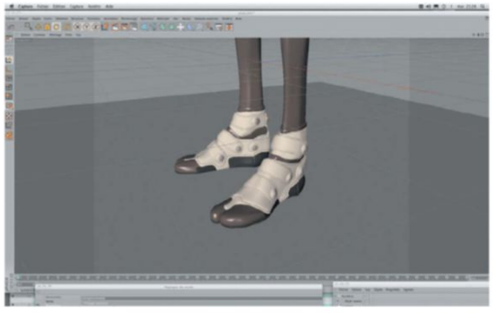
E *Untitled*. Pencil drawing attempt, coloured in Photoshop

F *Untitled*. Sketch of a Japanese peasant, coloured in Photoshop

Evolution of a 3D character model

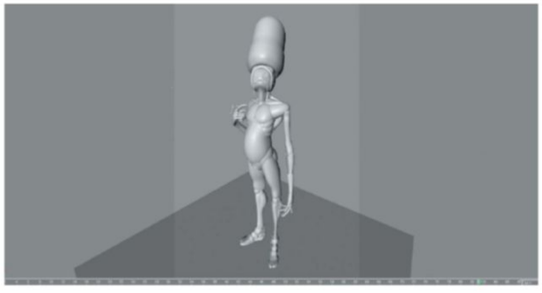


01 A preparatory drawing serves the purpose of studying and exploring proportions, and also positioning the accessories of a new character design.



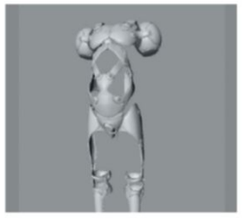
02 For this character I work on all the different elements individually, in this case working from the ground up, starting with his feet.

03 The next step is to focus on the arms. I much prefer to have a particular focus on each limb, working on them in different files.

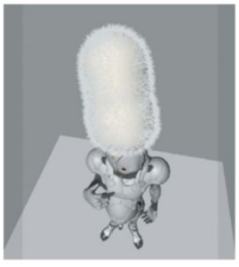


04 I then gather every element in order to make sure that they sit well together. This step usually necessitates a round of adjustments.

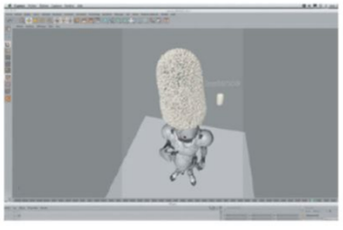
05 I start posing textures to visually differentiate certain parts of the body. Here I like to test out various accessories; for instance, the cape here is eventually removed.



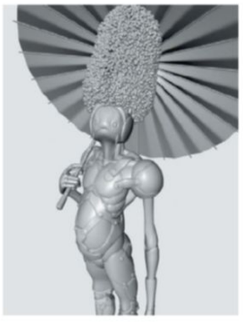
06 Once the attitude of the character is defined, I model his armour, which is also composed of a series of small shapes connected to one another.



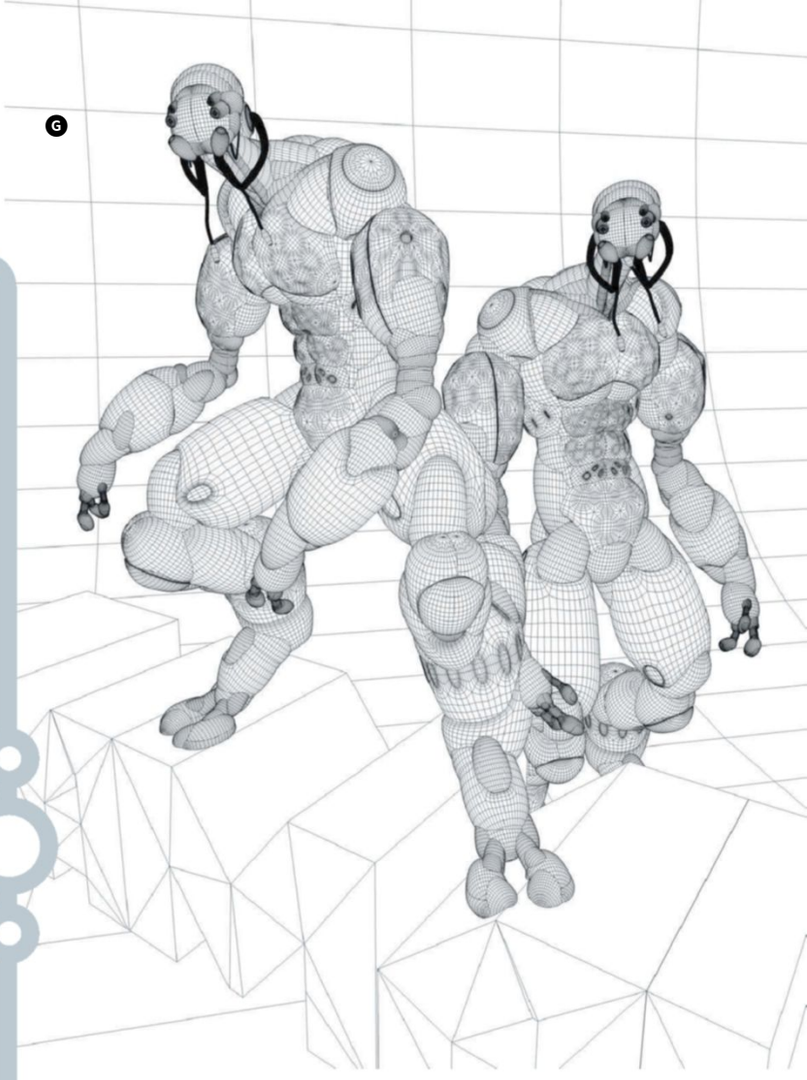
07 Then comes the delicate creation of the hair for the character's elaborate do.



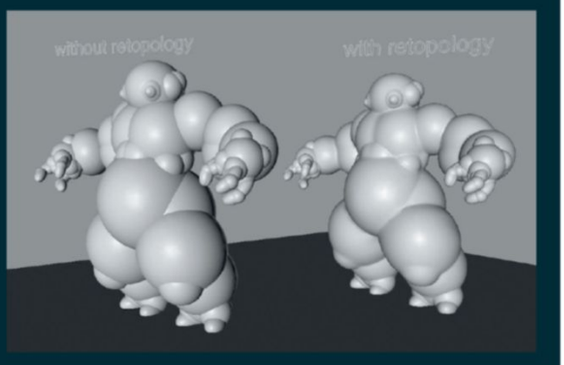
08 I use a capsule as an instance to give a fluffy look to the hair for a more lifelike effect.



09 Finally, the character is fully modelled and is now ready to be textured!

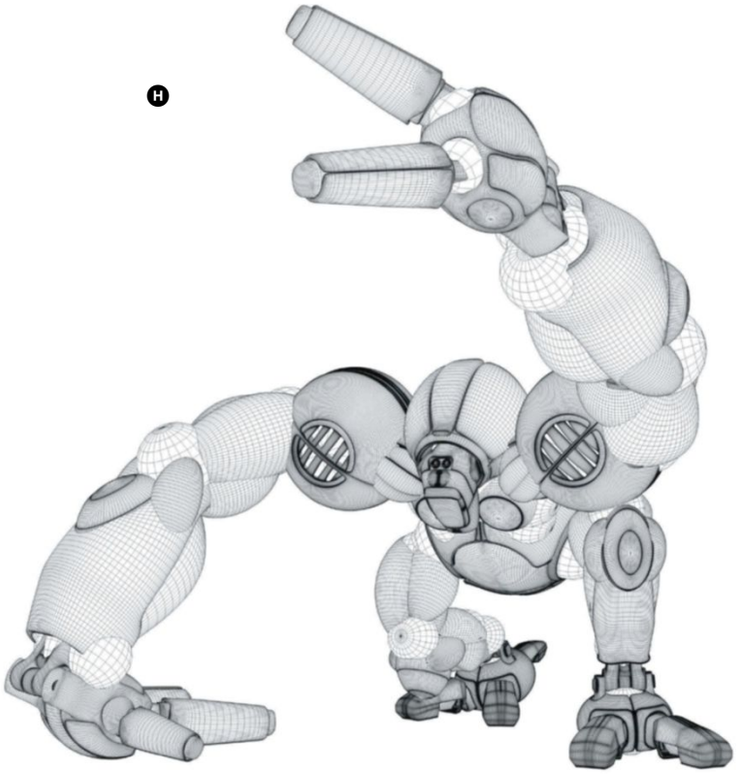


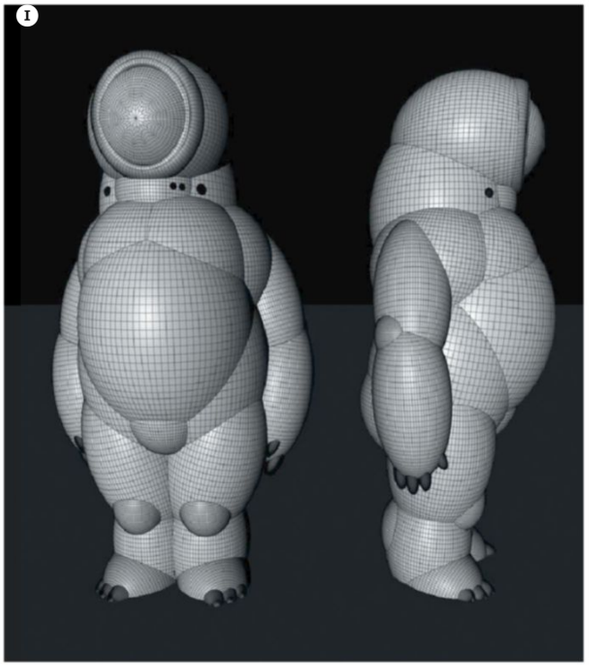
Key techniques



Keep order

This consideration may seem a bit of a trivial point for expert designers, but nevertheless it's a very important topic that deserves to be emphasised. Ordering things is essential once your model is under way. Using an accumulating method of spheres I will rapidly rack up a tremendous number of elements. It can easily become a total mess! To avoid such a situation, the best solution is to organise elements by 'families'. For my characters, I tend to use a folder structure by parts: arm, forearm, wrist, palm, finger, etc. I can also be more precise, if required, by creating subcategories in a general folder. The most important thing is to have a logical folder structure to enable you to work on a particular group with a simple action. It's the same approach that's used with animation, when working with bones. I can't recommend it enough!





G *Tracker.* Study on the musculature of a sprinter

H *Fat Robi.* A mixed technique using spheres and traditional modelling. This character was used in the Peugeot 3008 commercials

I *New B.* Simplified version of a character: the key idea was to remove his face to give the little man a frightening attitude. This character has also been used in the Peugeot 3008 commercials

Modelling characters with style

> The way I work is the opposite of how a sculptor would proceed: I pile up my shapes, whereas a sculptor would traditionally eliminate matter

In my view, what really matters is the essence of the character – that is to say its position, attitude and, ultimately, its personality. Before the modelling even starts, I make sure that my character can be summed up entirely within a single posture. I find that I can only start the task of modelling, when I am satisfied with this key 'hero' pose.

When I first begin modelling, the most important step is to make a practical study of the general anatomy of the character. It has to be considered as a skeleton, even if it doesn't look like one. It's essential to start with a structure that can be used as a base around which volumes can be added.

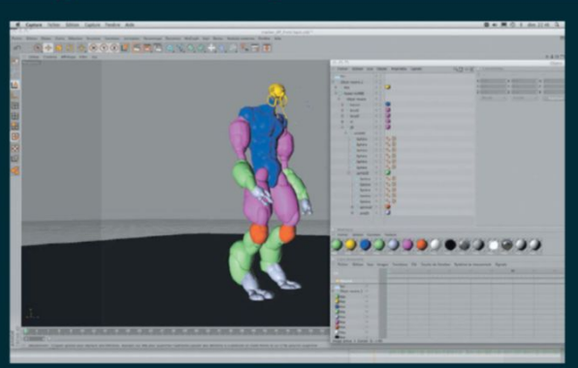
For me, I'm used to paying a lot of attention to the balance of the respective size of each element – it's basically a matter of proportions. The aim of this consideration is to ensure all proportions are working together to convey the intended attitude. It's only with this established that I decide on the character's morphology – a step where the character's shape is bound to change radically! Here, a stocky character might become very slender or vice versa – I never know in advance. At this point I'm basically feeling my way, and that's when unexpected things happen. This experimentation is all part and parcel of the process; I like to be surprised.

Inevitably, there is an element of improvisation when it comes to modelling. The number of possibilities is infinite! In my opinion, many of the decisions come down to the density of the shapes and the scale, as often the equation is solved in a random way. The way I work is the opposite of how a sculptor would proceed: I pile up my shapes, whereas a sculptor would traditionally eliminate matter. Starting with this method of accumulation, my process is rather simple. Indeed, from a technical point of view this is very basic.

Perhaps contrary to expectations, no advanced 3D tools really come into my initial workflow. I wouldn't recommend any software in particular for the reason that, at this point, only basic features are being employed. For the time being, functions such as extrusion and vertex motion can be left untouched.

The complexity of a character is not the key to its success. Often it is the simplest characters which are the most efficient. Still, the complexity is directly related to the personality I aim to give a character. For example, *Porouge* is very simple in its geometry (see 'Keep order' boxout). It is, after all, a collection of non-transformed primitive shapes, and the level of detail of its muscle structure is fairly low. It's almost wholly based on spheres.

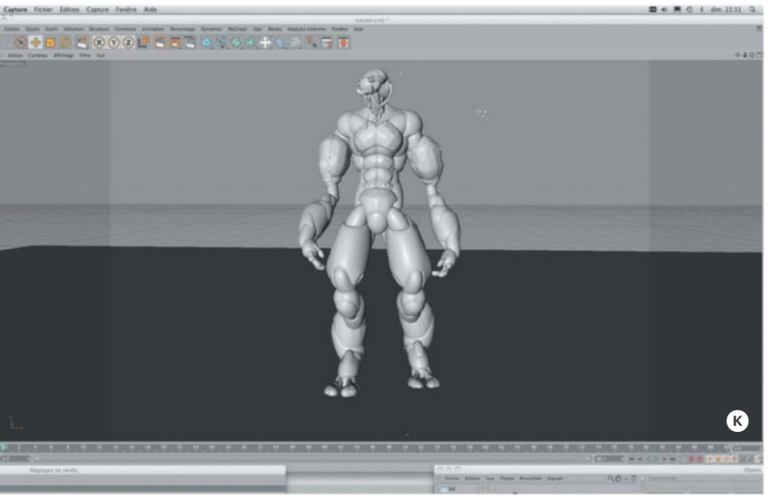
Key techniques



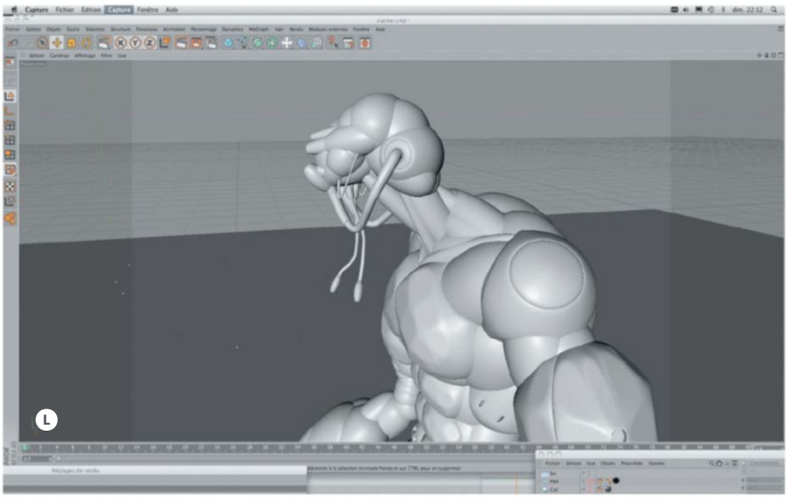
Retopologise

This technique is very efficient to help produce successful characters, but for retopology, you'll have to look elsewhere. For example, when making real characters such as art toys, or animating a character, the method of accumulating spheres in CINEMA 4D is not sufficient; you will have to use software that enables you to retopologise (3D-Coat, ZBrush, etc). Such apps provide the tools to easily create a detailed skin for the character, for the purposes of animating or producing a solid object. While the sphere method enables you to easily change the shape of the character by modifying the size of a particular sphere, by itself, it has its limitations. Using it in conjunction with other programs such as ZBrush really enhances your workflow, and ultimately broadens your options.

Tracker. These characters were inspired by Olympic competitors in the discipline of speed skating. It was a good opportunity to create rangy bodies



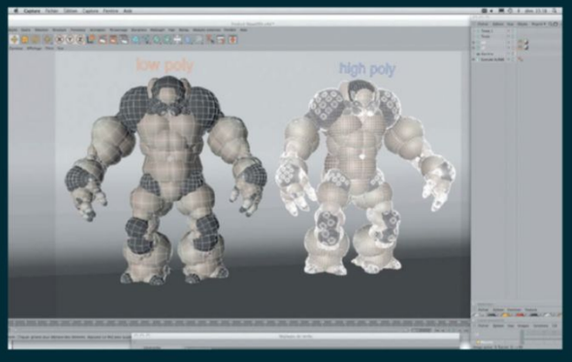
K L *Tracker.* Model in progress

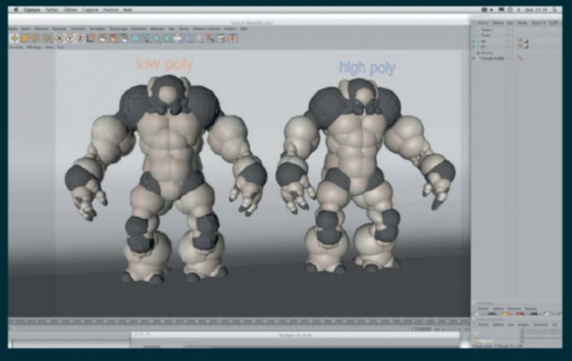


Key techniques

Work in sections

This is mainly with regards to robotic characters. When starting to model, it's better to use a new file for each part of the body. This exercise has more to do with the connecting phase, but it's true that this consideration forces you to pay more attention to each part individually. This method encourages me to go further with the details for each of the elements, enriching the model as a whole.





The low-poly policy

Always work in low poly. If not, when it's time to make modifications it will be very uneasy to return, as the object won't be at all easy to handle. To avoid this situation, I recommend working with a low-poly count, and if a 'finished' view has to be produced, you can make use of a smoothing tool such as HyperNURBS. Alternatively, the low-poly route enables you to make a quick jump from CINEMA 4D to ZBrush. To do this, I first import the object into the software, where I can then sculpt – if needed – with ZBrush tools to get a better level of detail. Next, I export it as a Displacement texture. Once re-imported into CINEMA 4D, the object behaves like a skin. It remains easy to handle, but without the raw, low-poly finish.

> The complexity of a character is not the key to its success

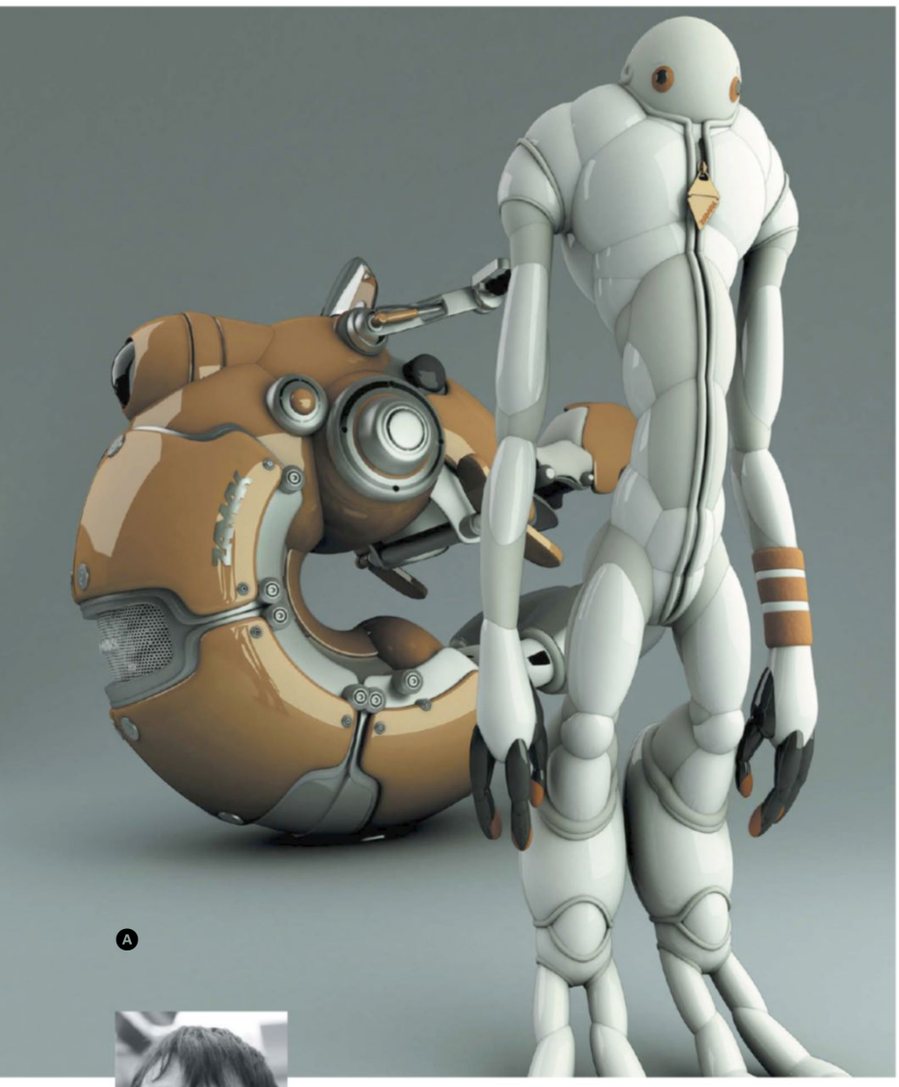
Here, I would like to digress a little by explaining my attachment to circles. In my opinion, the circle is the most interesting and fundamental of geometric shapes; it highlights the notion of homogeneity. It's also the best shape to convey an organic feeling – and, of course, the best way to reproduce the body's musculature. Therefore, the circle is the staple of my characters; in fact, many of them are exclusively made out of this shape. From one character to another, it has become my signature. It's now a constraint of every creation I make, and so has become a key consideration for each new 3D creation. Now, the difficulty consists of building any body form around this primitive shape.

The next concern is to determine the proper proportions for every element. For example, I need to define what the character's head size should be compared to the rest of the body. The main task is to not only work out element proportions, but also to find their right place. These are two issues that go hand in hand, although it's sometimes difficult to pay attention to both of the parameters simultaneously. As for this step of gathering elements, the assembly should be considered as a map. Although it might seem like a rather unorthodox method, finding the right combination in the layout is my staple practice in the modelling stage; I think it gives the character its strength. To me, the overall shape of the character can be quickly obtained when starting to model, while it can sometimes take me four or five times longer to obtain a complete layout of the elements. The rendering phase, in comparison, is a finishing touch!

Technically, my method – which consists of an accumulation of spheres – involves dealing with a growing number of objects. Very quickly I can be forced to work with very small polygon resolutions – my low-poly policy – otherwise, it could quickly become too heavy for the machine's processor to handle. This low-poly methodology imposed during the modelling phase keeps the character simplified to its minimal form, and this allows me to focus on only its essential features. In fact, I start working with 12-polygon spheres in order to render it quickly when needed, and to be able to run the animated scenes smoothly. This gives a very raw resolution, but at this early stage I'm not looking for too much detail. Nevertheless, as I go further with the modelling and begin to focus on the character's anatomy, I need to subdivide the polygons – that is once I've locked down the personality of the character. The important thing to keep in mind is that you're working from general to detailed.

My work, where spheres feature as the fundamental shape, often results in overly muscular bodies. To reduce this effect, I regularly allow myself to slim the character down by distorting the spheres. This enables me to compose something more slender and less uniform. Finding the right density is undoubtedly subtle, and may sometimes involve a long trial-and-error process.

Only towards the end of modelling comes the phase where I pay more attention to detail. Now that I'm more experienced in the creation of characters, I try to anticipate the forthcoming features. More technical 3D tools can now be used to create tricky parts of the body – eg the joints between the body and the limbs, or to create a specific area, such as the facial features. For example, when I make an eye socket, I may create a bevel that has a direct influence on the render. Early on in the modelling I'll picture a specific shape that will integrate a reflection. As much as possible, it's best to try to plan ahead; anticipating details *before* the render will save you a lot of work later on.



Ⓐ

For Olivier, if the modelling is the making of an object, then rendering is the creation of its 'packaging'

Name
Olivier Bucheron (aka Zamak)
Company website
http://zamak.fr
Location France
Expertise Design
Software CINEMA 4D, After Effects, Photoshop
Client list
Peugeot, Nike, Float Hybrid Entertainment and more

Packaging

Olivier Bucheron aka **Zamak** continues with an insight into how he brings his peculiar characters to life through texture, light and a little Photoshop postprocessing

Translated by **Quentin Hugo Bernard**

If you read the previous feature you will already have learnt some of the secrets behind the creation of my characters. Although concepting may not be a clear process, as it's unique to each artist, it is essential. This early step is made all the more important as it's the time to determine what is worth being reproduced from a particular source of inspiration, and what will give the character its essence. As far as I'm concerned, I'm passionate about circles and, as explained, my modelling technique is fairly simple; it's mainly based on a method that consists of accumulating spheres. It's quite unusual, but it's a key contributor to my characters' style.

Ⓐ This version of *Jumper* was rendered in V-Ray, including global illumination. The Zamak logo was later added within Photoshop

characters

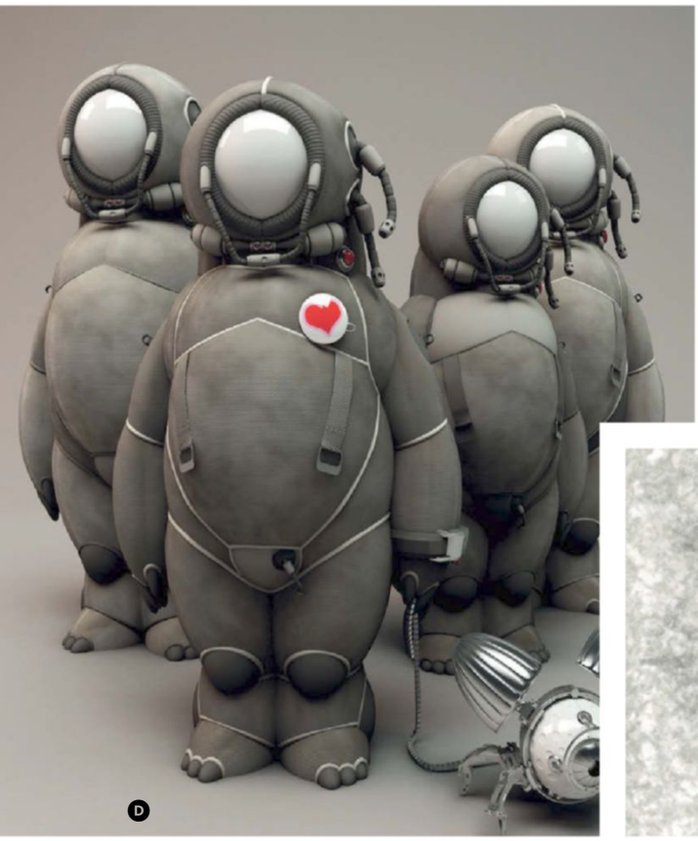
As a rule, we can say that modelling is a conceptual phase, while rendering is much more of a emotional stage in the creation process. Indeed, rendering is greatly influenced by subjective judgments regarding textures, lighting, colour, etc – and is directly affected by the individual tastes and sensibilities of the artist. And if modelling is the making of an object, then rendering is the creation of its 'packaging'.

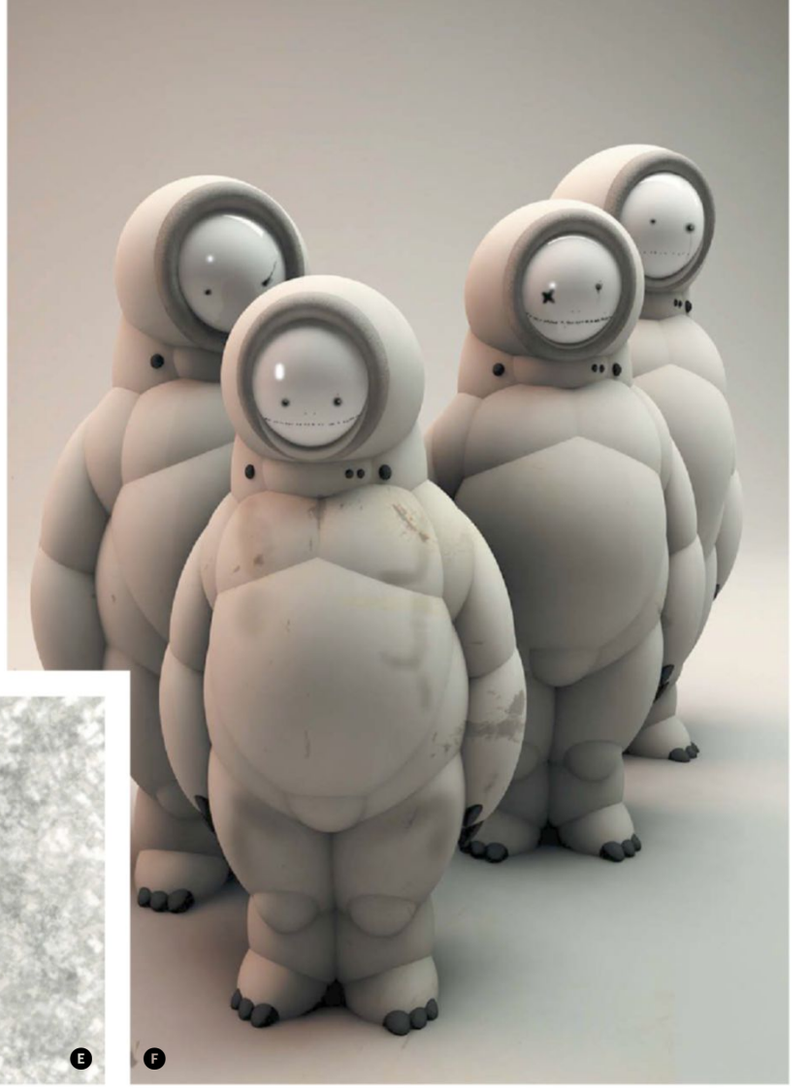
In this concluding part of my extended feature, I will present my methodology for creating a coherent and satisfactory finish for my characters via four key steps: texturing, lighting and setting up the scene, rendering and postproduction.

> "In general, I don't consider a 3D render as a final outcome. It's a very convenient medium that allows you to accomplish a lot of amazing possibilities, but it is still not a finished work"

B *Microcosme*. This image has been rendered in V-Ray with post-effects in CINEMA 4D; a special lens option enabled me to create a stream of light

C *The L y*. Inspired by the amazing Egyptian monument in Abu Simbel, I created this scene with an architectural background that lends itself to the notion of contrast when lighting





Give life with textures

> If modelling is the making of an object, then rendering is the creation of its 'packaging'

Once the modelling is done, the character is a raw, solid object with very little interest. The idea from there is to apply the look and feel of the character. I believe it's very important to take into account that the final character should not only draw the viewer's attention, but also appeal to the senses. With this in mind, I always make sure to give my characters a sensory dimension.

The goal is to highlight the dynamic already brought about by the modelled volumes by applying relevant textures. In the same manner as accumulating spheres in the modelling stage, this can give a wide range of impressions depending on whether the spheres are sparse or concentrated etc – the texturing can liven up the subject by offering a billion possibilities!

For instance, a reflective surface universally conveys a feeling of hardness and will suggest a mechanical feel to the texture. If I apply it to a part of my character's body, this will create a streamlined effect or the appearance of armour. On the other hand, if I reduce the reflection, I will inevitably increase the sensation of softness. If I suppress any type of reflection completely – creating a matte surface – then the render will give the impression that the shape is soft and flexible; the object will convey the appearance of plastic more than a metallic material such as iron. Likewise, with its soft look, a matte texture can also induce an organic feel, which is what you might require for skin. The number of possibilities is infinite! The difficulty lies in finding the right one, by balancing between hardness and softness; mechanical versus organic. I particularly like to mix soft shapes with hard surfaces in the same character, because I like to play with the notion of contrast. Making softness coexist with hardness creates an oppositional effect, which enhances both the textures' characteristics.

However, the balancing act all comes down to subtlety. There is no precise science when making a render. The best advice I can give is to have the patience to make a lot of tests until you get the look which works best with the character's profile. So far, my concern is not in finding the perfect render – at least not the final one – but to make sure that I have a general direction that will emphasise the character personality I had in mind when modelling/posing. I must confess that I have a real preference for simple textures that I can fine-tune later during postproduction.

Due to my modelling method of accumulating objects, I don't have a global object once the modelling is complete. In which case, I cannot unwrap the UVs when dealing with the creation of textures. As a result, I must independently create a texture for each object. For this technical reason I highly recommend making the most of the procedural textures offered in CINEMA 4D – their settings can be changed endlessly! In my experience, I always start from the software's library of textures, and then determine the grain of the texture to achieve the right density.

D *The Love Army*. The most interesting aspect of these characters is the texture on the spacesuits. It took me a long time to achieve the right kind of old leather effect I wanted

E This is an example of a bitmap texture for the final render of the spacesuits used on *The Love Army* characters; the diversity of the texture fits well with the style of the characters

F *The Love Army* (alternative render). I rendered this alternative version of the original image just as a fun test with different faces

Shed light on the subject

Early in production I'll often make a decision to focus on the character. This is why my characters all tend to be presented within environments that have similar atmospheres – they're all very minimalist. I keep scenes simple and naturalistic so that the character is the element which is put in the spotlight, and welcomes the viewer's scrutiny.

To describe lighting setups for my images, I could compare them to a photographic studio: that is to say, a special setup that focuses only on the model/character and nothing else. I take inspiration from watching advertisements where models are shot on very neutral backgrounds to underline the particulars of the presenter or a product.

In my opinion, there is no point creating a lot of decoration. Artificially adding objects to fill up the scene may bring parasitic elements and could disturb the main message of the image. In an empty environment the characters speak more; this suggests a story, and the lack of details encourages the spectator to create their own interpretation of the scene. From this perspective, I always choose homogeneous lighting, with the concern not to create too much contrast between light and shade. In my eyes, too much contrast would bring too much drama and distraction.

As far as the lighting setup is concerned, the idea is to reveal the object through its reflection of the surrounding environment. I must say from the start that I always opt out of using specular. Since specular is in fact a fake reflection induced by the soft light, I generally find its effect too artificial. I much prefer to add my highlights manually in postproduction. So instead, I use a real diffuse reflection in production; this allows me to obtain a global illumination effect. In contrast to the specular option, a real reflection creates much more richness and realism in the lighting. It's true that the real reflection definitely brings a more subtle relationship between the object and the light. It's far more manageable and leads to better images, but be warned, it inevitably increases the render calculation too.

This said, the environment setup is immediately linked to the different characteristics of each texture. In the case of a reflective texture, I use a lightcard system – a plane with a luminescent texture. In addition to this, I create the environment under the form of a textured sphere, either with an HDR (High Dynamic Range) image, or by making an image directly in the software. As a result, the solid object will reflect the whole sphere.

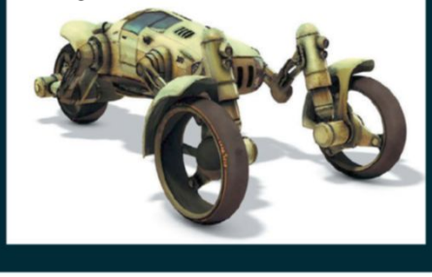
At this point, the work process may become very empirical. I often have to make adjustments that are linked to the texturing outcomes. Regarding less reflective surfaces, like matte or organic textures such as skin, I still create a very dim reflection. I keep the lightcard and make it reflect very slightly, just to emphasise the forms.

Key techniques

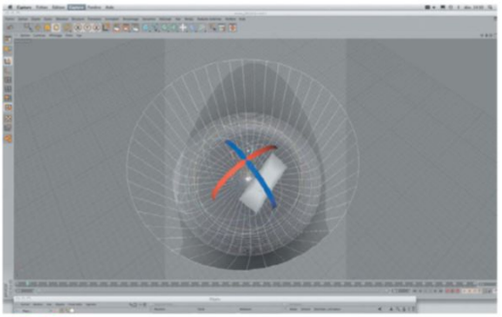
Matte painting

This is exactly the same image but the version below shows a matte painting done in Photoshop. I intended to create a cartoon aspect to the image, at the expense of realism. Both of these 3D shading treatments give a very different meaning to the final image. The difficulty is in choosing what style you ultimately want to get!

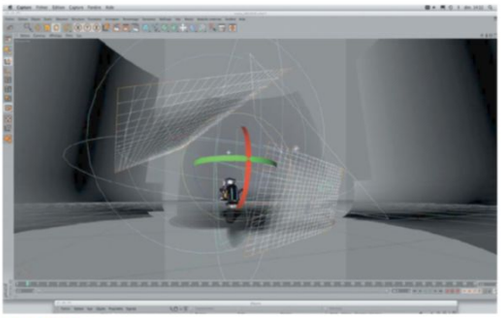
The image above was rendered in Advanced Render with global illumination and 3D shading. The second one is a very rough render, also done in Advanced Render but without global illumination



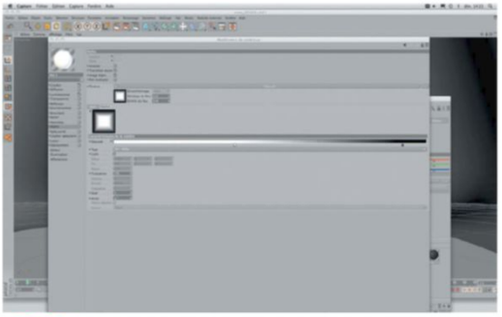
Setting up lights



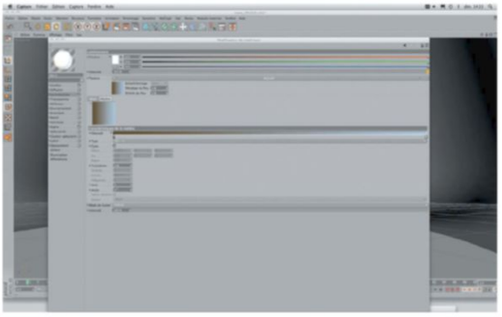
01 I take a global environment created with a cylinder and an Omni light.



02 I create two planes to which I add a luminescent texture, as well as an Alpha map with a gradient set up in Box mode in order to optimise the reflections.



03 This shows the setting up of the Alpha map. I directly apply these textures onto the planes in order to get a global reflection.



04 These are the final settings of the lights. Including a colour gradient will bring out a significant nuance in the reflection and make a more dramatic impact.

Choose your renderer

All my images are created with a global illumination – or at least the non-animated images – working with the traditional V-Ray renderer and Advanced Render. I must make it clear, however, that when working on an animation, I don't use any global illumination. This is for the simple reason that it's far too heavy to handle for my computer. Unless you have a render farm, I advise not trying to do this with a personal computer. The main difference between both of these render solutions is that Advanced Render is included in the CINEMA 4D software and is the dedicated module to launch renders, whereas V-Ray is an external software allowing for a wider range of options. Although I have used V-Ray a lot, due to its better performance and greater flexibility, I now render exclusively with Advanced Render as I find it easier to manage; it's also been greatly improved. What's more, with my characters I don't need to have an extreme degree of realism in my renders. I can choose to render a rather basic image and I will rework it in postproduction. In fact, when exported from CINEMA 4D, the image is far from finished! It's a bit frustrating, but I know that I do far better fine-tuning in Photoshop or After Effects.

My point has always been to leave open the maximum number of options. I therefore render several images. Likewise, I model different shapes in different files; I like to render separately in order to have the best control over the final image by being able to touch up each element of the image independently – this can save a precious amount of time! Following the same logic, when using Advanced Render, I also render in Multi-Pass mode. This enables me to dissociate each layer – for instance the lights, colour, reflections, diffusion, refraction, etc. It's important to have as much material as possible to keep your options open. I can optimise when touching up the image; with each element being independent, there is no more time wasted tracking down or cutting out objects.

Key techniques

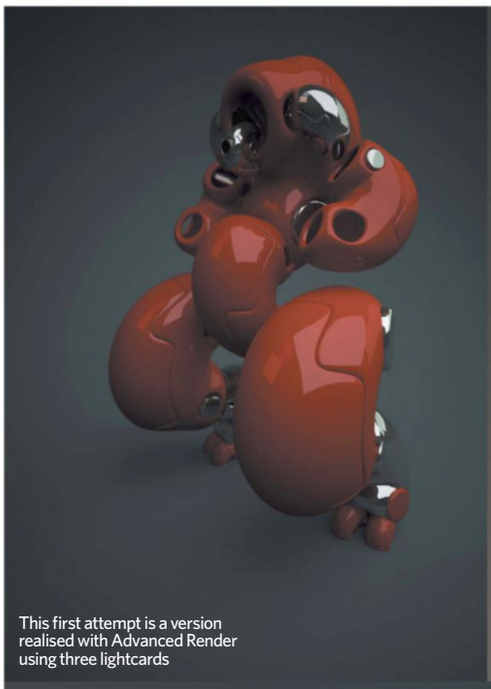
Basic materials

Although it can be far more complicated, there are three elements that are staple when creating a texture. This is my basic recipe: a combination of colour plus luminescence plus reflection. This is the primary formula of every material that I have ever created!

United colour settings, alternatively referred to as the Fresnel

The colour is homogenous but less intense for the auto-lighting of the texture

A very slight reflection enables you to get interesting nuances of colours in the texture; this can create a global illumination effect



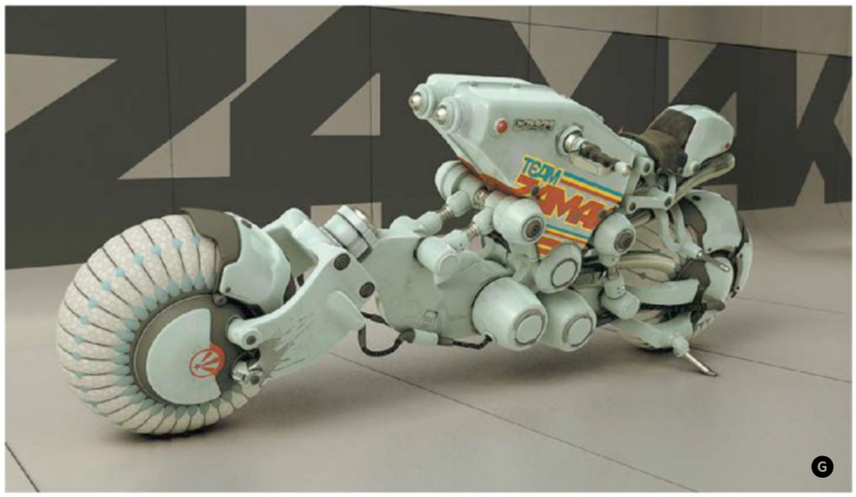
This first attempt is a version realised with Advanced Render using three lightcards

This version has been rendered with V-Ray, with three lightcards

Practice makes perfect

For the final version I mixed a render from Advanced Render for the character with a render in V-Ray for the background

Here we have three variations of the same image created with different render options and settings



> Images depend on a particular feeling at a given moment; this method can allow an image to evolve, depending on my mood

Postproduction

> Above everything else, my ultimate ambition when creating a character is to convey an emotion

In general, I don't consider a 3D render as a final outcome. It's a very convenient medium that allows you to accomplish a lot of amazing possibilities, but it is still not a finished work. I rule out the possibility of using the postproduction effects in CINEMA 4D because I find them too complicated, and I also don't want to fix things definitively before rendering the character. I prefer to keep a wide scope until the last moment, and create various alternatives. After creating one version of a character, several months later I can go back to it and achieve a completely new version. Images depend on a particular feeling at a given moment; this method can allow an image to evolve, depending on my mood.

The most artistic part of my work actually starts when I'm fine-tuning my characters in postproduction. Perhaps contrary to expectation, I think my characters really start to come to life in 2D applications like Photoshop or After Effects. The key point is to benefit from postproduction to give the characters their real style. At the very least, it's the conclusion of the whole creation process. It's also the step when the most research has to be done, so as a result, this is the stage that takes the longest amount of time for me. However, this is also my favourite part of the process as it offers that very gratifying moment where the final features of the character emerge!

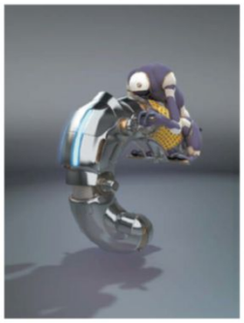
At this stage, I'm trying to give the character its aura, as well as an underpinned narrative. I originally graduated from École de Beaux-Arts and have always been passionate about drawing, so the postproduction phase is naturally the most exciting, as well as the most challenging. It's that moment when I can go back to more traditional art, and really command the image. This is precisely when I can make the image more graphic. As surprising as this may sound, I regularly reduce the degree of realism of my images by introducing a hand-drawn dimension. I'll sometimes even kind of 'undo' my 3D by removing a certain part of the character because it might no longer fit with the style I have in mind. Even if it's taken me a long time to create it in 3D, I don't hesitate to carry out big changes like this if they're necessary.

Technically speaking, when it comes to postproduction I'll first adjust all the colours by setting the saturation, shading, contrast and tints, etc. I'll then do the compositing by gathering all the passes I've rendered out. Once composed, I have an overview of the image and can adjust layers relative to the others. Next, I'll employ a matte-painting technique to re-colour, redesign or even re-texture a given part of the 3D character, but in 2D. For instance, I will sometimes layer photographs to re-texture an area of the object and produce a different effect.

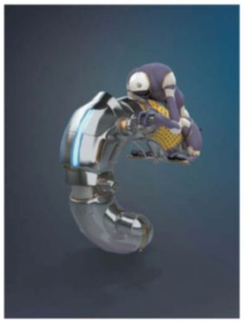
G *USSR Roadster*. This machine was rendered with Advanced Render with my own global illumination. I used Photoshop for postproduction – most notably for the dirt marks on the mudguard

Postproduction tips

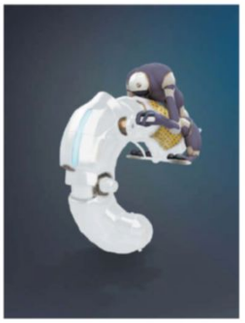
This sequence illustrates the different effects achieved in postproduction during the creation of *Jumper*



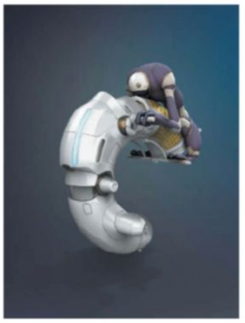
01 I take a global environment that's created with a cylinder and an Omni light.



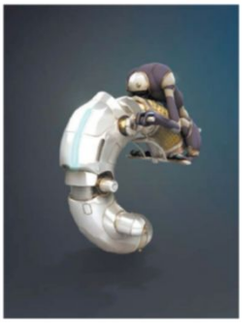
02 Thanks to the Alpha pass, I can cut out the character in Photoshop and modify the background.



03 Next, I take care of the colours. Here I have also tweaked the bike in Photoshop.



04 Still in Photoshop, I add an AO pass, as well as a Refraction pass for the reflections.



05 This is the final render with colour correction to give a cohesive tint to the whole image.

Key techniques

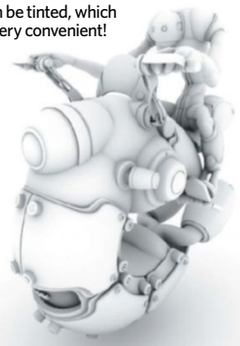
Stay flexible with Multi-Pass

I render in Multi-Pass mode. This enables me to separate each layer in order to keep the maximum number of options open. Since each element is independent, there is no more wasting time tracking or cutting out the objects. This is how I optimise my workflow when touching up images in postproduction.

The Alpha map enables me to easily cut out the character

The Alpha map of the motorbike also helps so that I can work on it independently

The Ambient Occlusion pass can be tinted, which can be very convenient!



The Refraction pass is dedicated to all the reflections so I can adjust their intensity

The Specular pass is used to adjust the impact of the light on the subject. I can use it to add some more lighting effects

The Shadow pass is dedicated to the refractions to adjust all the glass

The Shadow pass also enables me to adjust the intensity of the shadows on the ground, as well as on the character

And here is the final image!

Conclusion

> “Artificially adding objects to fill up the scene may bring parasitic elements and could disturb the message of the image”

It’s true that concepting and modelling are compulsory steps in so far that they give a character its general features and energy. Nevertheless, the character will only really come to life once the more concrete steps of creation are tackled, such as texturing, lighting and rendering. In my opinion, the postproduction phase should not be considered as an afterthought; rather it can be the stage which really brings out your particular style.

In conclusion, my methods of character creation might not be seen as very orthodox. But above everything else, my ultimate ambition when creating a character is to convey an emotion. Following this direction, a high degree of realism is not the first of my concerns. On the contrary, I much prefer to give a graphic dimension to a character; my aesthetic always prevails over my technical skills. I am proof that, even if you don’t initially have much expert ability when it comes to 3D, inspiration and perseverance will take you a long way.

Jumper. For this character, the image was rendered in Advanced Render and the postproduction was entirely done with After Effects. For this reason, there is no global illumination

“I particularly like to mix soft shapes with hard surfaces in the same character, because I like to play with the notion of contrast”

Create a stylised 3D pinup

Belle 2011

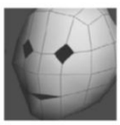
A playful, sexy female character combining burlesque aesthetics with classy 3D modelling

Andrew Hickinbottom is a freelance character modeller & 3D illustrator

The purpose of this extended tutorial is to show the development and creation of a stylised female pin-up character. I will be using 3ds Max as my application of choice. Knowledge of basic modelling methods will be beneficial, because there isn't the space to explain everything in depth. Knowing how to use 3ds Max's unique modelling toolset will help, however the steps can be adapted for other programs (like Maya or XSI) if you are familiar with general modelling terminology like cut, extrude and soft selection. The final model will be completed towards the end of this tutorial, where the pinup will be textured and posed to most sexy effect.

Concept

I don't usually sketch out designs as I get frustrated trying to put my ideas on paper. I want to design Belle with a mix of burlesque fashion and latex elements – creating a matt, silk and gloss juxtaposition.

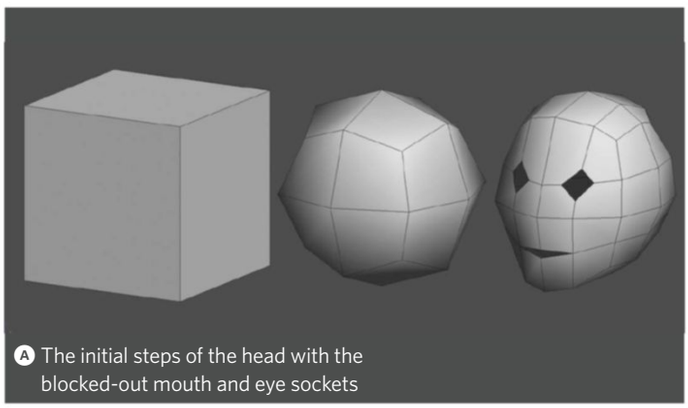


Head's up

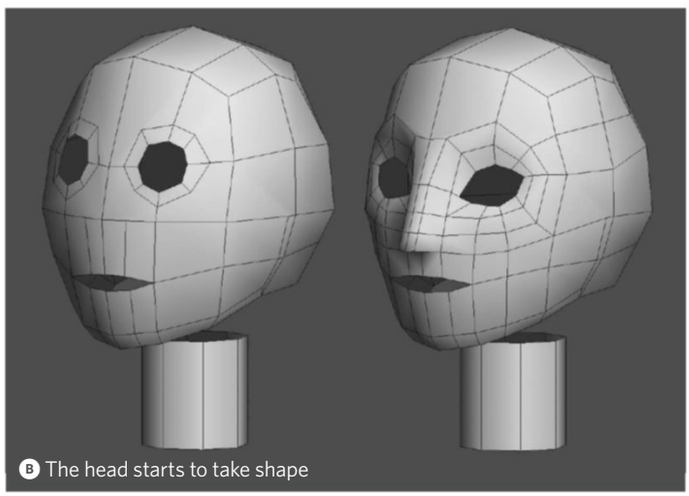
Begin modelling your pinup

01 Get a head start

I usually begin with the head, as it is the most important element to establish the character. I begin with a box, subdivide it (using the Turbosmooth modifier) then collapse the modifier stack down to an Editable Poly object. I then begin to pull points around to sculpt it into a more head-like shape. Edge loops are added where necessary using the Connect and Cut tools. Now I have these additional edges, I chamfer points for the eyes and split edges for the mouth to create the basic groundwork holes for the face. Deleting half of the model and adding a Symmetry modifier is essential at this point A.



A The initial steps of the head with the blocked-out mouth and eye sockets



B The head starts to take shape

02 Head features

Next, it's important to establish the jawline of the head, as many of the edge loops will flow towards it. Using the Cut tool, I add these new edges where needed and pull the points around to shape the jawline. Extra edges are applied to the mouth and eyeholes to gradually increase definition.

An eight-sided cylinder is added to form the basis of the neck. The nose is extruded from a polygon selection I created by cutting the boundary of the nose. It is blended into the head by welding and cutting it into the topology. Next the eyes are shaped by moving the points and I start to cut radial edge loops circling the eyes. It doesn't matter if it's a little messy – collapse any stray point clusters and move the vertices around to tidy it up. Try to keep your polygons four-sided and nicely spaced out B.

Create a stylised 3D pinup

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Andrew Hickinbottom

3DArtistonline

Personal portfolio site
http://andyh.cghub.com

Country UK

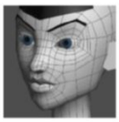
Software used
3ds Max, V-Ray, Photoshop

Expertise Andrew specialises in cartoon-style character modelling. He has a strong passion for pin-up art, and this is the genre in which he particularly excels

Modelling

Software used in this piece

3ds Max | V-Ray | Photoshop

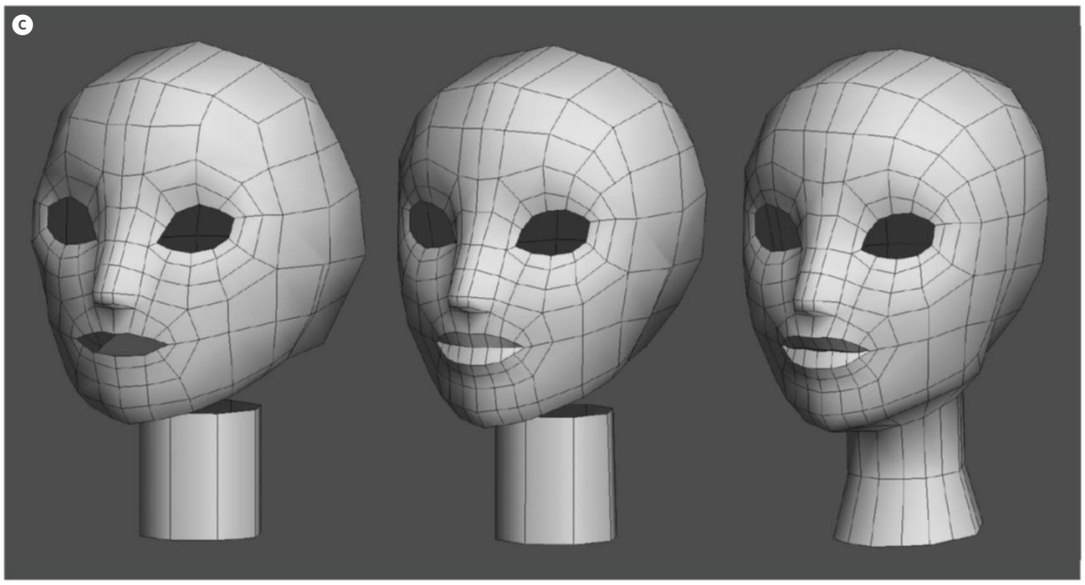


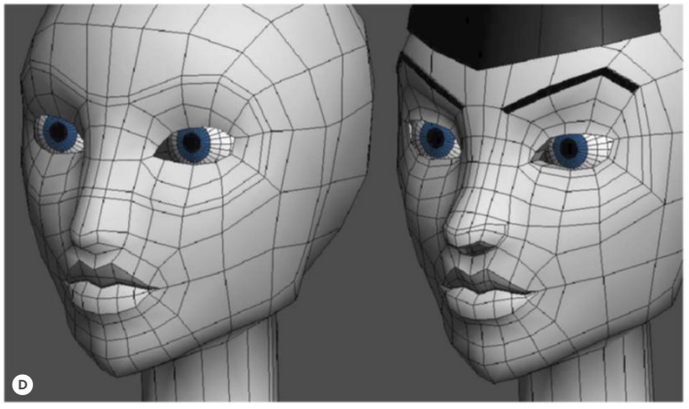
Nail the noggin

Refine the head mesh

03 Head topology

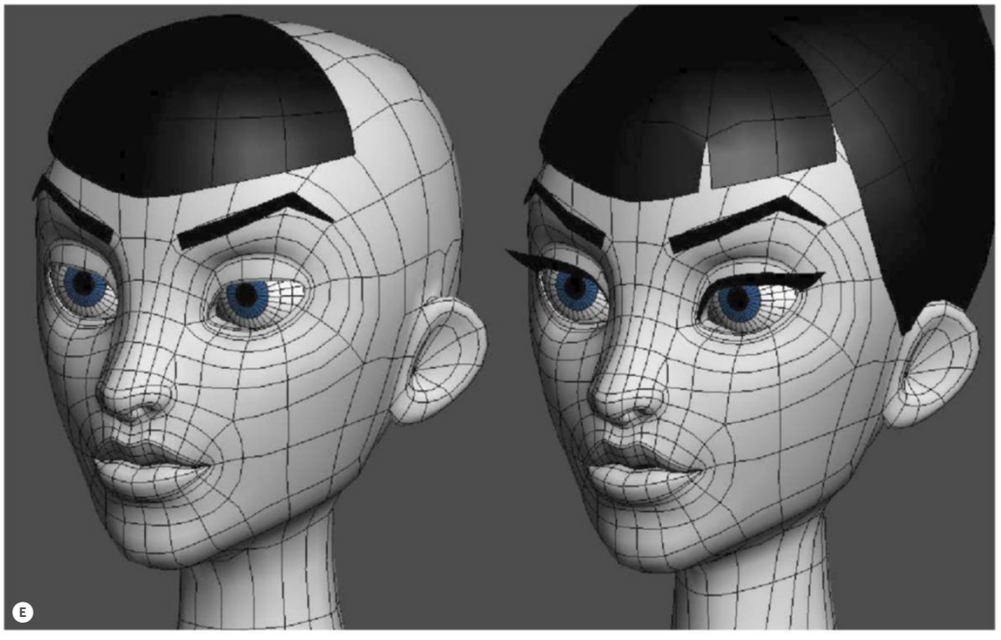
Now I work on the core topology of the head. Using the Cut tool, I carve circular edge loops into the model around the mouth and eyes. My method can be a little messy, but be sure to take advantage of collapse points and edge constraints (found under the Sub-Object>Edit Geometry tab) to manipulate and tidy the mesh. If you have any other topological reference (such as that off a CG forum), you can use this now to see how the topology is laid out. My aim is to get the core geometry simple and tidy, while giving the head a generic shape. I can work on detail and specify the shape later. I attach the neck using extruded edges and weld points C.





04 Head refining

Now the core topology for the head has been made I am ready to add detail and give it the shape I want. I work in some basic eyes (spheres with coloured material groups), adjust the eyeholes to fit and then shape the lips by pulling the points around. I find that her hairstyle is quite important, so I block out her fringe (a modified plane primitive) and eyebrows (cloned polygons from her head) so I can visualise the face better. Basic ears are made from cylinders placed into position, and the nose is detailed using Cut and Extrude polygons for the nostrils. At this early stage, it can be useful to take advantage of smoothing groups to simulate sharp edges before we start subdividing the mesh – see the lips for an example D.



05 Head refining 2

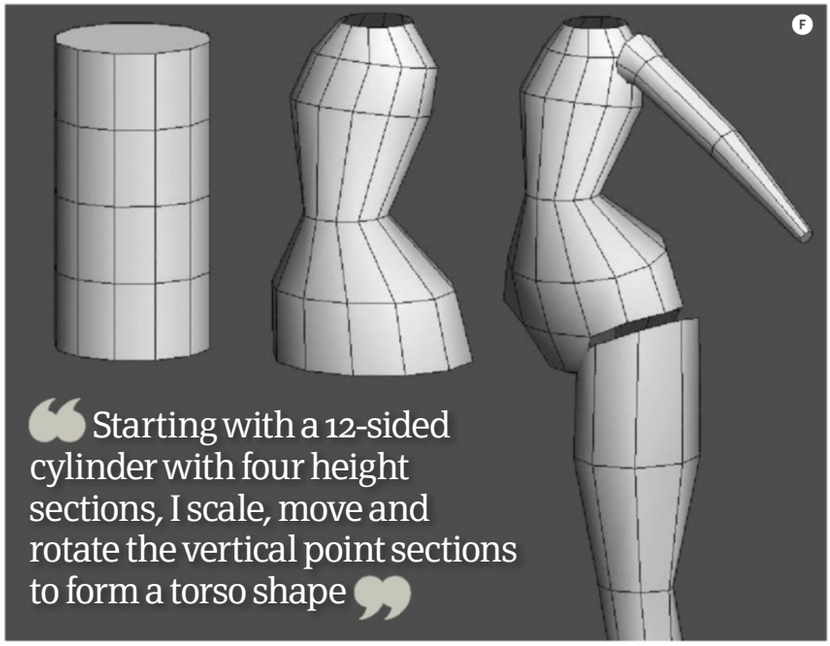
By now, the mesh is detailed enough to start using subdivision. First I add a Turbosmooth modifier. It will be necessary to cut new edge loops or chamfer existing edges (like the lips and eyelid crease) to tighten shapes and lessen the slackening effect when subdivision is applied. The ears are attached by deleting and restructuring the joined area manually, and the eyelashes are a single sheet of polygons extruded from the eyelid, then detached and given a black material. A partial sphere is manipulated with soft-selected points to form the bulk of her hair E.

Body building

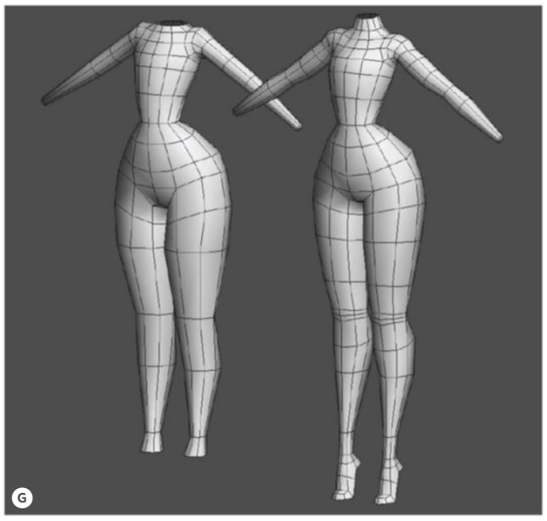
Put the head aside and work on the body

06 Work on the torso

Starting with a 12-sided cylinder with four height sections, I scale, move and rotate the vertical point sections to form a torso shape, adding edge loops with the Connect tool where needed. Rough arm and leg shapes are made from eight-sided cylinders in a similar way and then positioned into place to approximate the proportions of the character. Like the head, it is important to block out the whole body and establish the proportions first, then work on the detail F.



> Starting with a 12-sided cylinder with four height sections, I scale, move and rotate the vertical point sections to form a torso shape



07 Body definition

Now using Symmetry, I attach the body pieces together and close the gaps by welding nearby points. The end result can look a bit untidy, so I clean the mesh up, remembering to use Sub-Object edge constraints when necessary to space out the edge loops while keeping them constrained to the surface mesh. I usually turn this on and off while tweaking points – it's useful for keeping the volume of my model when editing points. I keep moving points, adding edge loops with Connect and generally smoothing and shaping the mesh into what I want. The feet are made by extruding edges (hold down Shift and move a boundary edge) from the bottom of the legs and manipulating points G.

F The body parts are made from edited cylinders

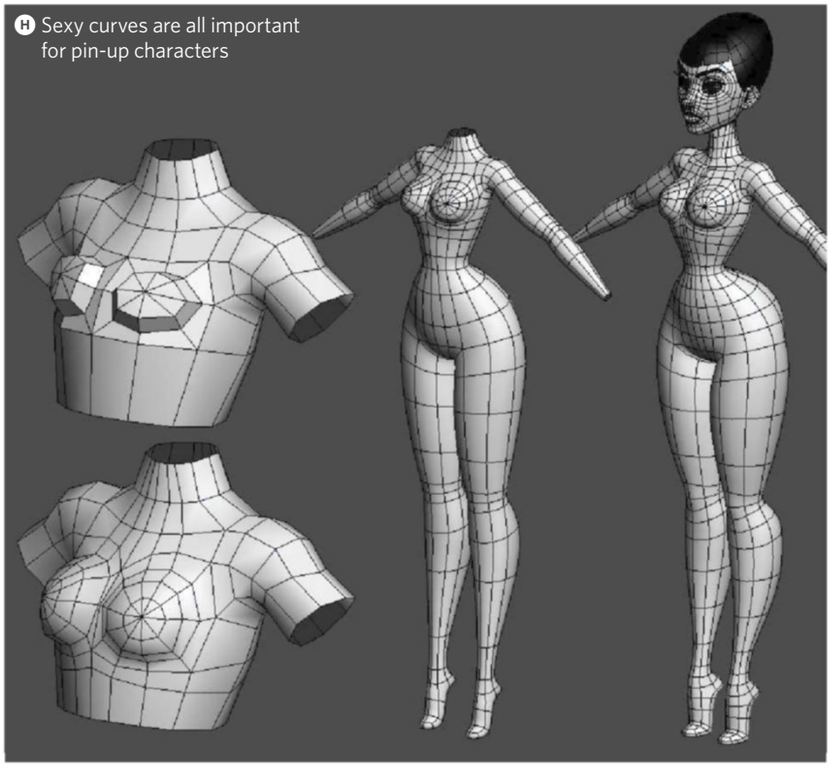
G Limbs are connected and the body slowly takes form

Getting a-head

There are many ways to approach head modelling – and I have tried most of them! The one that I prefer is the box-modelling method. My personal take on this technique can be a bit messy, but if you have a clear idea of the topology (or a wireframe reference to hand), it's easy to cut the topology into the base mesh and tidy up after yourself, restoring clean topology and ensuring there are no duplicate points while having nicely spaced out four-sided polygons. Don't be afraid to use modified low-poly primitives as base shapes wherever possible, and try to keep your body as multiple parts (fingers, arms, legs, etc) to make it easier to work on until you are ready to attach it all. Try not to overdo the polycount as well; it's much better to start off as low poly as you can, then add edges or subdivide to increase detail.

08 Body shaping

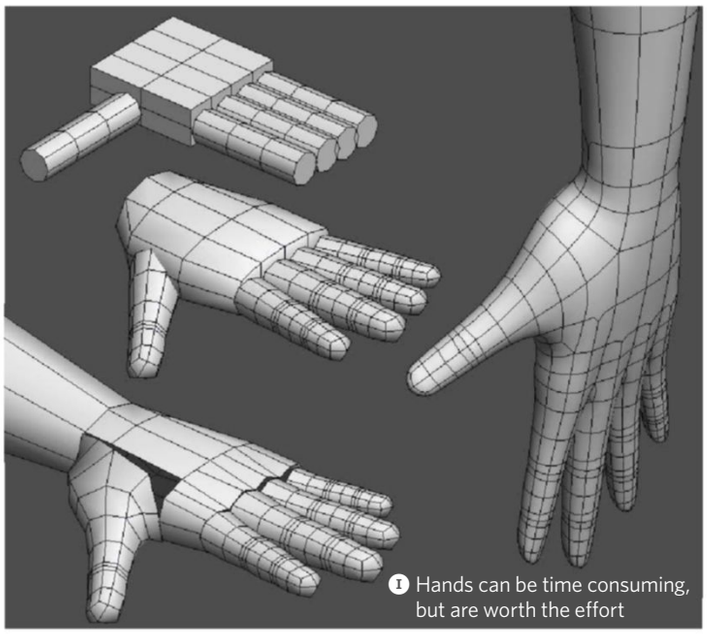
The breasts are created by bevelling a four-polygon group from the chest area – I adjust the points to make the shape rounder. Next I add another edge loop around the breast to increase volume. You may need to add another edge down the centre of the body. Now is a good time to add Turbosmooth and start tweaking the whole body. Be sure to have enough edge loops at the joints for deformation. Soft-selected point manipulation is useful for making smooth, subtle changes. The head is now attached to the body H.



H Sexy curves are all important for pin-up characters

Finalise the nude mesh

With the rough body shape done, it's time to wrap it up



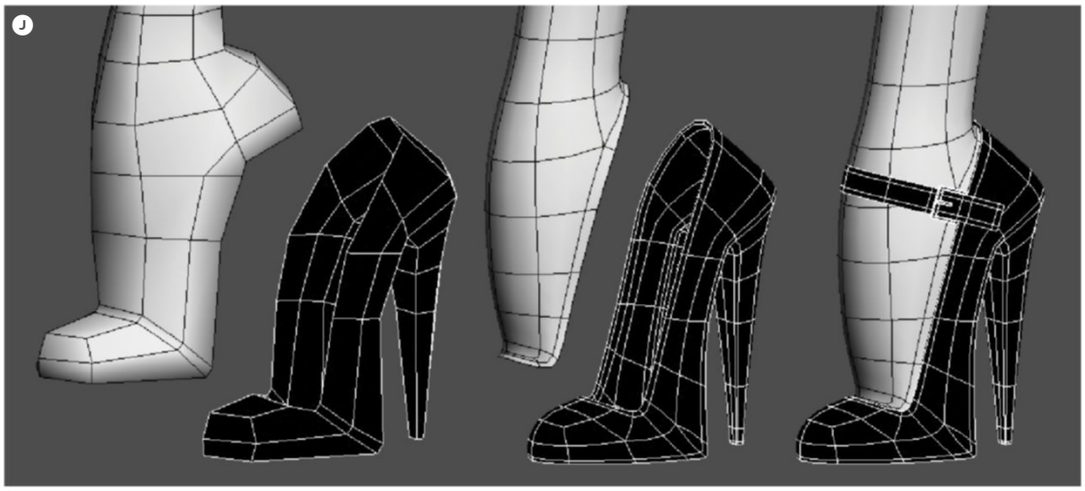
I Hands can be time consuming, but are worth the effort

09 Get handy

A box with four segments and an eight-sided cylinder with three segments form the basic hand. Make sure you copy the fingers as instances, so you only need to work on one of them. I scale, move and tweak points to form a basic segmented hand, and then weld it all together. The thumb can be tricky as it joins the palm at an angle. I extrude the edges of the thumb to form a logical palm topology and gradually weld it to the main part of the hand, cutting and adding edges where necessary. As my character is wearing gloves, I don't need to model fingernails, nor do I have to worry about topology perfection, as she won't be animated. When refined, I adjust the scale of the hand and weld it to the arm stump I.

10 High-heels

The base mesh of her shoe is made by detaching the relevant foot polygons as a clone. I use the Push modifier to make this new mesh slightly bigger than her foot, then start moving points (remember to use the Edge Constraint tool) to shape the rim of the shoe. The heel polys are extruded and scaled down to a point. I add Turbosmooth and begin to tighten the shape by adding edges where needed with the Connect tool. The geometry of her foot inside the shoe is deleted and the edges cut to match the shoe rim. A strap is made from an edited plane, and a slight thickness is given to the shoe using the Shell modifier J.



J

Keep things in proportion

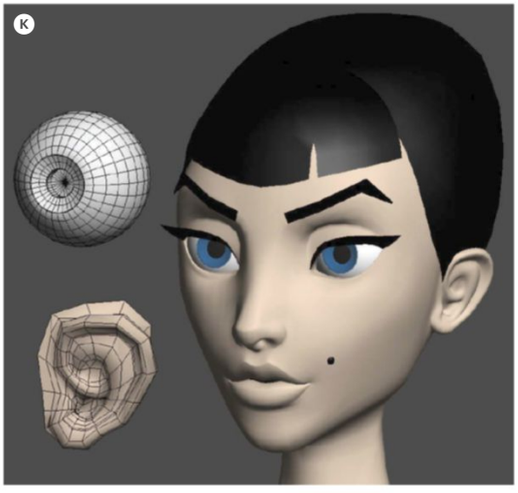
Proportions are very important when designing characters. They set the style, as well as affect the composition and help show the personality of the character. I collect a lot of illustration/cartoon art books and images from the internet to help inspire me. Model sheets from animated films can help give you a better idea of proportions that work well for certain characters too.

Don't be afraid to experiment with differing styles and proportions when blocking out a character model. It's easier to define the proportions early on than to completely change sizes and limb lengths when you have already detailed them.

When modelling, I sometimes find that adding a 3ds Max biped rig to your scene can really help with proportions – just drop one in and scale the limbs to the proportions you want. Then you can put it on a separate layer, freeze it and build up your model around it.

11 Belle's head revisited

Now I've got the body to a level I am happy with, I'm going back to the head to adjust it. Using point manipulation and Soft Selection, I subtly tweak the shape of the head to make it more appealing. Proper eyes are made by creating a concave indent in a sphere and adding a cornea, and I weld on some detailed ears I made previously for another model. It's important to re-use or repurpose complex geometry sometimes to save time and effort. Modelling an ear is quite difficult and would take too much space to cover here K.



K

J Form-fitting clothes like these shoes are based on the body geometry

K Tweaking and fine-tuning the head was important to get her looking as appealing as possible

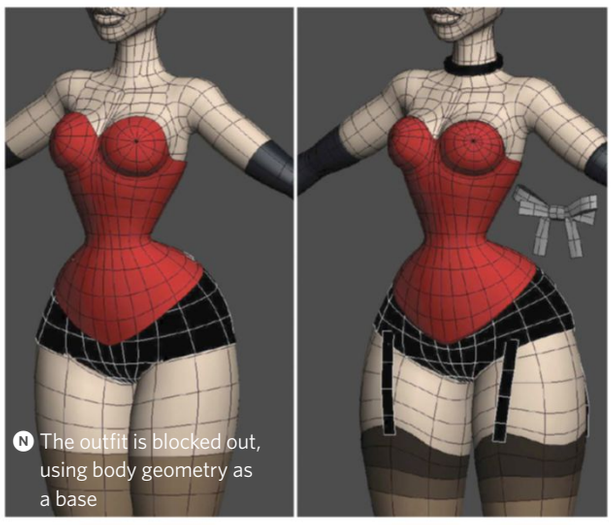
L The hair looks complex but is broken down into four simple objects

12 Hair we go

My character has a somewhat unusual hairstyle. It's called the Victory Roll and is quite iconic in burlesque/vintage styling. I start with a single polygon positioned at her temple and extrude and position edges over and over to 'grow' the main curled area. It is very important when making hair to get the topology to flow in the same direction as the hair strands would. This becomes a big timesaver when adding detail or texturing later on L.

13 Finish the head

I Turbosmooth the hair, keep on moving points and adjust it to fit the base hair sphere I made earlier. Certain edges are chamfered to give a sharper, more sculpted look. Her bangs are split in places, and I add some finer curls near her ears made of poly strips with a Shell modifier applied. I give her eyebrows more detail and make some final minor tweaks to her face until satisfied M.



N The outfit is blocked out, using body geometry as a base

14 Dress to impress

Time to make her clothes! In the case of her gloves and stockings, I merely assign a different material to them, as they are skin-tight. Her corset and pants are made from detached cloned polygons from her body. They are then puffed out slightly using the Push modifier and the excess edge polygons are cut away. Remember to use Edge Constraint when moving points along the body shape. I begin making a bow by repeatedly extruding and moving edges from a plane. The suspenders start off from polygon strips N.

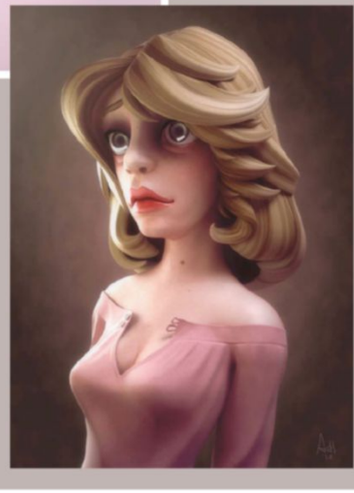
Artist showcase

Andrew Hickinbottom

I have been doing 3D modelling/illustration (self taught) for over ten years. I have a passion for 2D illustration and animation, but my drawing skills let me down. As a result, I try to use the medium of 3D to convey the aesthetics of 2D animation and create strong, appealing character designs.

Ooh la la! **3ds Max, V-Ray, Photoshop (2010)**
This was created as a gift for a French illustrator friend of mine. I tried to give it a humorous, cliché and very stereotypical French look

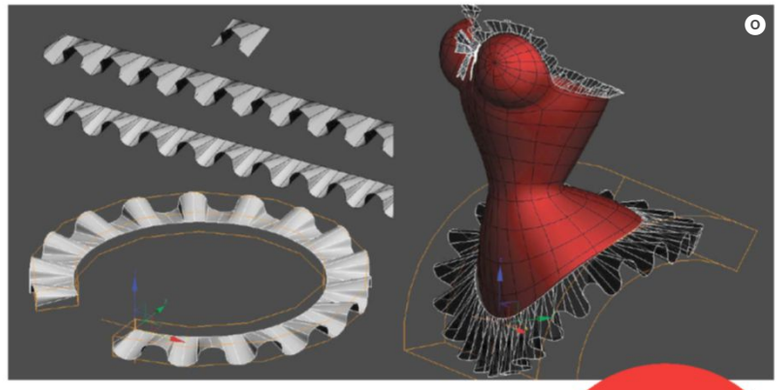
Trixie **3ds Max (2008)**
Kinky cartoon character influenced by my favourite illustrator, Shane Glines. I tried to place emphasis on bold, exaggerated forms and shapes



1978 **3ds Max, V-Ray, Photoshop (2010)**
Caricature of Gaylen Ross, who starred in the 1978 film *Dawn of the Dead*. I tried to keep it stylised, yet create a more realistic mood than my usual work. I also tried to capture the expression she has in the film

Creating the outfit

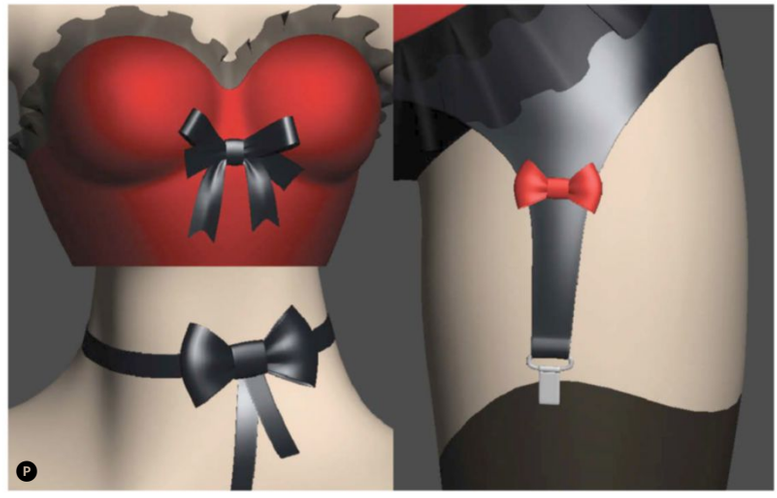
It's time to dress the pinup



48 hours **modelling time** Resolution: 2,200 x 3,000

15 Frills and ruffles

Now I create the frills that are part of the corset. The skirt frill is made flat using a simple repeated mesh stitched together to form a long strip. I then use multiple Bend modifiers to first wrap the frill 360 degrees around her waist, and then to bend it to follow the corset edge. I use the Soft Selection option to tidy it up and tuck it under the corset edge. I use a similar method for the top frill, but with more manual point manipulation to follow the top contours of the corset O.



16 Details and finishing

She's nearly done now, so I take some time to finish off any bits that I haven't yet done. I model the clasps on her suspenders using an edited plane and then apply a Shell modifier. Her collar is made by editing the main bow and making a simple choker ribbon that sits flush to her neck. The same technique is used to make her wrist bows. An upper layer is added to her skirt frill to give it depth, and I generally spend some time ironing out any flaws, intersections and bits that need a final polish P.

> The skirt frill is made flat using a simple repeated mesh stitched together to form a long strip. I then use multiple Bend modifiers...

O You can see how the skirt frill is made by using Bend modifiers to fit it to the corset

P Here the final details are added to the sexy pinup

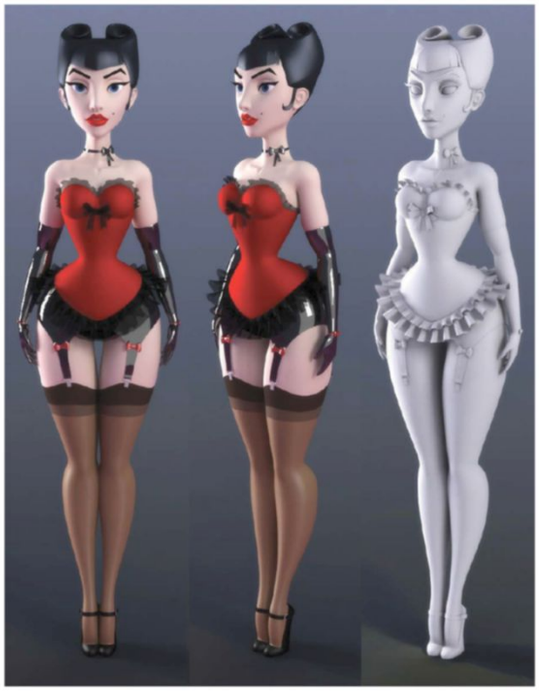
The following part of this tutorial covers texturing and final presentation. I will show how I took the poly model of Belle which was made in part one (in the previous few pages), and transformed her into the final image. We will be looking at UV mapping, texturing, shading, lighting, skinning, posing, detailing, composition, rendering and, finally, how the image was brought together in Photoshop. Basic to intermediate general knowledge of 3ds Max is required. I will be using V-Ray to light and render the scene, though these steps can be adapted if you are familiar with other renderers, such as mental ray. I will also be using ZBrush for a few steps, although these are optional.

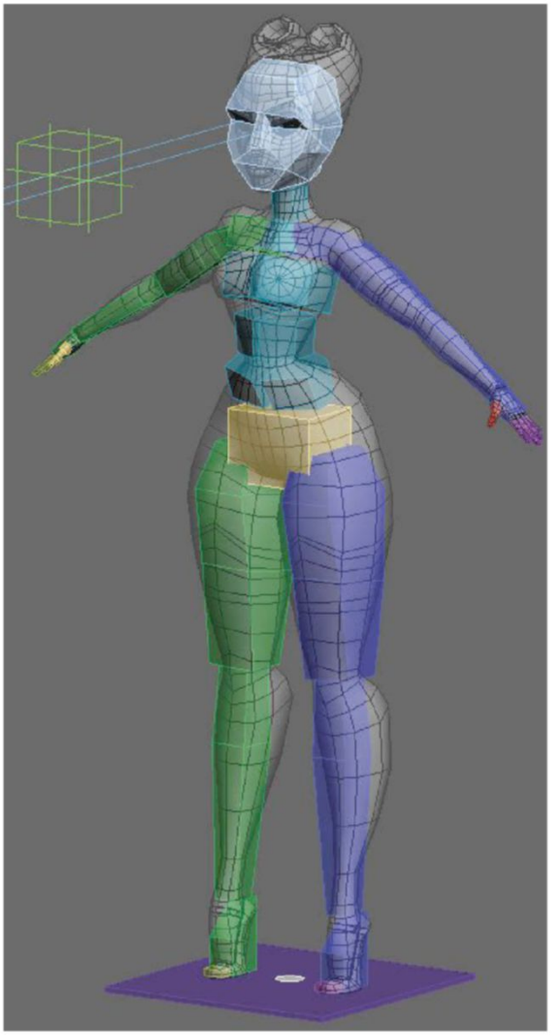
Lighting and posing

Set up the lights and a rough pose

17 Lighting To help visualise textures and shaders as I progress, it's important to add some lights early on. Two medium-sized VRayPlane lights are added on opposing sides of Belle: one acts as the key light, and the other acts as a rim light. I turn on Indirect Illumination in the render settings to create some ambient light too.

A VRayPlane object (or just a regular polygon plane) on the ground serves as a light bounce surface. The colour of this surface greatly influences the overall lighting – as does the Global Illumination environment or background colour. I adjust the settings until I get some pleasing results Ⓐ.





Ⓐ I've added some basic shaders to these lit model renders – I'll go further into shading later

Ⓑ 3ds Max's Biped tool is a great premade rig for people not too experienced at rigging

Ⓒ Trying out several rough poses to find one that I like

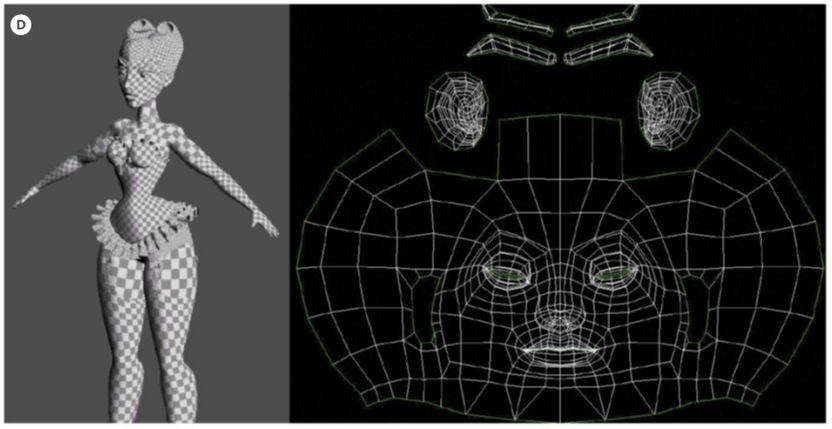
18 Rigging/biped setup
I need to get Belle rigged and skinned to make a series of pose tests. I find the creation of custom rigs time-consuming, so 3ds Max's Biped rig tool is perfect. I create a biped and rotate/scale the joints to match Belle's geometry. I add a flattened box to act as the rig's parent object, and make two nulls parented to a dummy box to serve as the 'focal' points for her eyes Ⓑ.

19 Skinning and posing I joined her various meshes to the biped rig using the Skin modifier. Bone envelopes are adjusted to give her some satisfactory deformations in problem areas like the elbows, hips and shoulders. Next, I try a series of test poses to help me decide on a final position Ⓒ.

> "A stylised, sexy and fun pinup combining the aesthetics of burlesque, lace and latex"

Texturing and shading

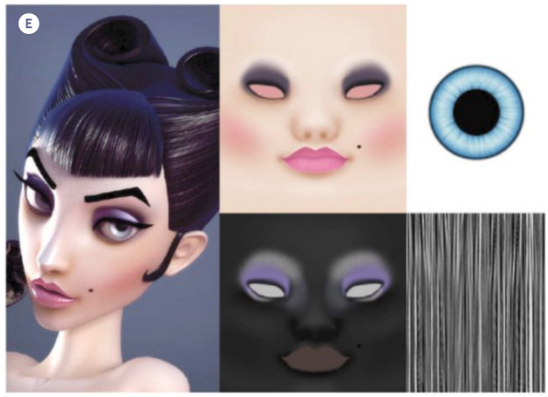
Now we can start bringing her to life…



21 UV unwrapping Make sure your entire model has fresh UV co-ordinates to clear any mess. I usually apply Front Projection to everything first. Next, I add a UVW unwrap modifier to each object that needs texturing and begin selecting the edge seams I want to split in Edit mode. I break these seams to separate the UV surfaces and logically lay out the pieces, then use the Relax tool to unwrap them, occasionally pulling a few points around manually. The face can be a bit tricky, so make use of symmetry and work on problem parts, like the eyes, as separate pieces and then stitch them back D.

20 Texturing: skin and hair The skin texture is pretty easy, as I don't want too much detail: a base colour, shading where needed, and some make-up will do. I overlay an outputted wire image of my UVs to help me see where to paint; I also make simple Bump, Gloss and Specular maps for the head.

The hair is even easier; because I've modelled the hair neatly with topology that emulates the directional flow of hair, I can use a straight hair texture. In the previous step, I unwrapped the hair UVs and then forced them into straight lines (like a grid), so that the UVs distort the straight hair texture to flow with the hair geometry. The hair texture is simply Photoshop noise with a Motion Blur filter E.

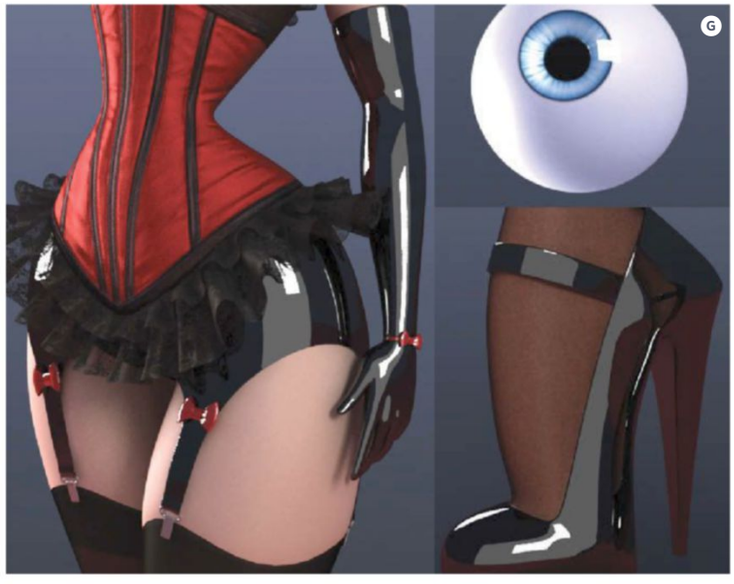


Workflow

Creating a tutorial for this second part was more difficult than the first part due to my somewhat chaotic workflow. When creating an image like this, I don't plan everything in advance – I make it up as I go along through a series of adjustments, happy accidents and varying tests. I find that adjustments to the shape, pose, camera angle, background, lighting and so on are much quicker to do in 3D than sketching them out. I often modify geometry, and adjust textures and lighting, etc, as I go, depending on how it looks as the image progresses. This tutorial seems very ordered, but it doesn't necessarily mean you should follow the steps to the letter. If you skin and pose your character and then find the proportions need changing, feel free to go back a few steps and adjust the model. The same goes for textures, shaders and most other elements of the image: be flexible and use these steps as a guide, not a rulebook!

22 Texturing 2: clothes Belle's corset mesh was exported to ZBrush so I could sculpt some panel lines and subtle creases. The displacement data was exported and applied as a Bump map back in 3ds Max. It was also used as a guide for painting the coloured trim. A repeatable lace texture I found on CGTextures was modified and applied to her corset frills as an Opacity and Specular map. Her stockings were simple bands of colour with some subtle shading and noise applied F.

23 Shaders Belle's outfit has several materials, such as lace frills, nylon stockings, her suede corset and her latex garter belt and gloves. Most of them are simple V-Ray materials – I just play around with the Reflection and Glossiness values to get the desired finish. Her skin is also a VRayMtl, with low Reflection and Glossiness values. Her stockings are a standard anisotropic material (not V-Ray) because streaky/anisotropic reflections can be tricky in physical renderers like V-Ray. A light/dark directional falloff texture mixed with the Diffuse channel helps to get certain material effects too. Mix up your shaders and experiment to get the best look G!



Set the scene

A classy joint for a classy gal

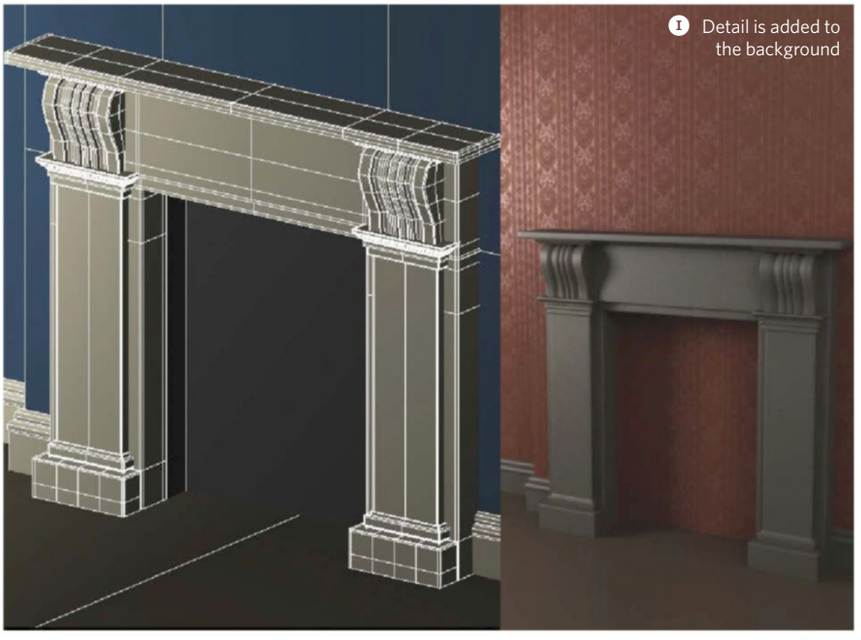
H

24 Background: blocking out ideas

I start blocking out shapes for the background using coloured planes and boxes to see what works in terms of composition and setting. I quite like the idea of a warm, rich, old-fashioned living room with contrasting textured wallpaper and an old ornamental fireplace. This would fit nicely with Belle's style and add to the burlesque aesthetic H.

25 Background 2: development

I start detailing the fireplace using basic modelling tools like Extrude, Chamfer and Connect. I apply TurboSmooth, giving the fireplace edges a tight curve, which helps catch the light for a more natural look. I begin trying out different colour schemes to see what works. I found and modified some old repeatable wallpaper textures from **www.cgtextures.com** and tried applying them as Specular and Mix maps to see how they look when lit I.



I Detail is added to the background

26 Pose development

The background is taking shape, so I spend more time trying to get Belle into a satisfactory pose that integrates with it. I try out several different poses, adjusting lighting, textures and shaders as I go. I decide on a straight-facing camera angle for a clear, symmetrical composition. I also try adding a feather fan behind Belle to frame her face with a splash of colour, and to add to the burlesque feel. These were edited planes that had Bend modifiers applied, which were then copied (with instancing) and arranged J.

J

Strike a pose

Posing is very important in character illustration, especially when aiming to portray the subtle nuances and appeal of the female form. Dull poses can kill good models!

In my opinion, a clean, simple shape is the most important thing. Imagine a simplified invisible curved line going through the character, and try to achieve a clear, easy-to-read silhouette. Creating a tapered shape by crossing the legs slightly or bringing the feet together can help to portray lightness and elegance, while at the same time keeping the composition focused on the upper part of the character and showing off the hip curves.

In Belle's case, I want to keep her arms high so that the curves of her hips and corset, plus the detail of her skirt frill and latex garter reflections, would be uncluttered and clear to see. Her latex-clad arms also have to look very sleek and elegant, and the arm positions I choose help to frame the face and draw the viewer's eyes in.

Feel free to refer to illustrations or photographs of women online or in books/magazines for pose inspiration! Real-world reference will always enhance your work.

D Applying a procedural chequer texture can be useful when checking for UV distortion

E Render of the head with a selection of skin and hair texture maps

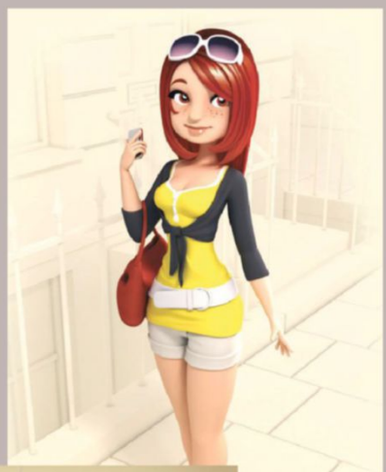
F The corset detailing, and some clothes texture maps

G I will be modifying my shaders throughout the project, as tweaks to the lighting can change their appearance

H When you don't have a definite idea, it's good to block things out in simple shapes first

J Close-up of the improved textures/shaders, and some pose development

Artist showcase



Debbie **3ds Max, V-Ray, Photoshop (2010)**
A cute girl inspired by Londoners I've seen walking around during the summer months

Cathy Ray **3ds Max, V-Ray, Photoshop (2011)**
Fifties-style pinup. In homage to Gil Elvgren, quite possibly my favourite artist of all time!

Rebuild **3ds Max, V-Ray, Photoshop (2011)**
I made this shortly after the March 2011 quake/tsunami in Japan. I dedicate this image to those that lost their lives, those who were displaced and to the strong spirit of the Japanese people

Changing rooms

Test out colour schemes and decoration

27 Background ideas Happy with her current pose, I apply a simple hand-painted texture to the feathers. The fireplace was bisecting the image in an awkward place (her hips), so I experiment by adding things like curtains, rugs, alcoves and arches to improve the composition. Most of these elements clutter the image, but I like the alcove idea since it frames Belle and the feathers nicely, helping her stand out from the background K.

28 Colour tests
I now spend some time coming up with colour variations to aid composition, enhance the mood and make the image as striking as I can. I toyed with the idea of making the background more vivid and colourful than Belle to make her stand out, and her corset has also changed colour several times L.

29 Final colour choices I decide to use the teal shade for the background. The alcove, skirting board and fireplace are all the same colour to act as a solid compositional frame for Belle. I apply some basic textures to the fireplace and floor, plus also try extending the skirting board trim to flow around the alcove arch M.

K Trying out different background elements to aid the composition

L A selection of the many colour variations tried

M The final colour choice with a paintover showing the compositional flow

N The lighting is adjusted to look more dramatic

O The creases are subtle but make a difference – especially on the reflective latex parts

P The three passes composing the final image: an Ambient Occlusion pass (the middle image) can also help to boost shadowed areas and increase definition

Q Here you can see a rundown of my Photoshop layer process, as well as the blend modes and percentages

Fine-tuning

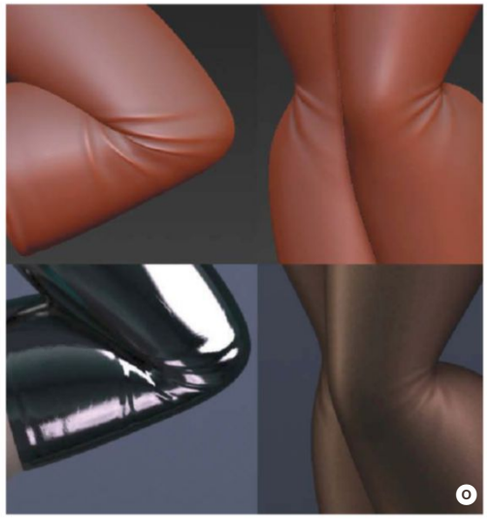
It's now time to apply the final touches!

30 Lighting adjustments Lighting can make or break an illustration, so I spend time making it more interesting and dynamic. I still only use two lights: I just change their intensities and positions to get a good dramatic look, ensuring I get some interesting reflections in her latex garments. Adjusting environment values helps too. I chose to remove the skirting around the alcove, as it looked excessive. During this part, I also adjusted her pose slightly and experimented with several corset colour schemes, which proved unsuccessful. I settled on a teal background and teal corset N.

Faking it

When creating a 3D character and environment for the purposes of a single illustration, you can get away with so much more than if you were modelling for animation. You needn't model detail you don't see, such as the definition of Belle's bottom and the rear of her corset in this case. Topology does not have to be as perfect, because I am only putting Belle into one pose. The posed model can be collapsed to an edit poly (or you can use an Edit Poly modifier on top of the skin) to freely edit it as a polygon model, improving problem areas and bad deformations. You can even fake parts of the environment and lighting.

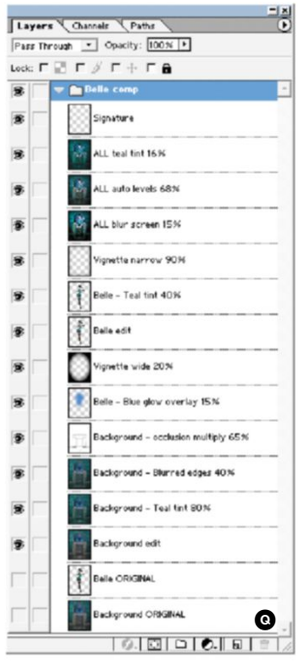
Behind Belle is a light blue polygon plane with a procedural Radial gradient Opacity map. This is made 100% self illuminated and excluded from shadows; it acts as a fake glow, and can come in useful for many occasions such as boosting parts of the composition or where the lights aren't doing quite what you want them to. The specular highlight on the wallpaper was faked using a Radial colour gradient on the wallpaper Mix map and positioned using the UV co-ordinates. Feel free to fake whatever you can to speed up the process when making illustrations.



31 Background texturing and ZBrush detailing I'm pretty happy with the overall look now, so I take time adding some detail. It's not essential, but I take her into ZBrush and sculpt some subtle garment creases on the elbows, knees and ankles. This sculpting is turned into Bump maps and applied to the relevant materials. The fireplace is now UV mapped properly and specular mapped to get a nice mottled and worn look. Belle's make-up colours are also tweaked to fit with the chosen colour scheme O.

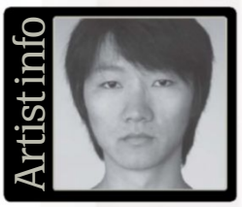
32 Rendering To enable some basic element of layered control in the final composite, I decide to render Belle and the background separately. In Belle's Object Properties, I disable Visible to Camera so that the background pass retains the shadows and reflections of her and vice versa when I do the same with the background objects. In the render settings, I increase the Irradiance Map quality and the Global Subdivisions multiplier, and reduce the Noise Threshold parameter to get a smoother image P.

33 Comp it up After more than three hours of rendering, I was ready to composite the images in Photoshop. My objective was to make the image look clearer and less computer generated by applying photographic effects like focus, vignette and film grade. The tinting/grading effect is done by going to Image> Adjustments> Selective Color, and then modifying the colour values for the Black channel. Cyan-tinted black areas work particularly well in this case Q.



Belle

Final masterpiece



RenPeng Dong

Personal portfolio site
www.oldrhyme.cgsociety.org

Country China

Software used
3ds Max, Maya, ZBrush, Mudbox, Photoshop, V-Ray

Work in progress...

> I saw an image on a website that was like a kind of transparent man blending with his background, which brought me this great idea... [I] decided to show the feeling of part drying paint, part real, part plaster

RenPeng Dong, *Painter,* 2011

Modelling
Rendering

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Federico Scarbini

3DArtistonline

Username: loden

Personal portfolio site
http://federicoscarbini.com

Country Italy

Software used
ZBrush, Photoshop

Expertise Federico specialises in creature design, organic modelling and texturing

Software used in this piece

ZBrush Photoshop

Source files available

MatCaps: **'FS_sss_clay.zmt'**, **'FS_Backscatter.zmt'**
Brush: **'FS_fur_strand.zbp'**
Alphas: **'fur01.psd'**, **'fur02.psd'**, **'fur03.psd'**

Sculpt feathers and flames in ZBrush

The Phoenix 2011

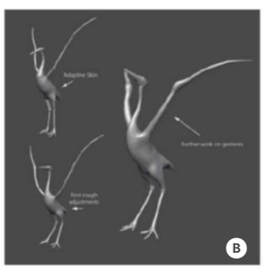
Follow the process of The Phoenix, from initial clay sculpt to applying feathers and flames to bring the bird to life

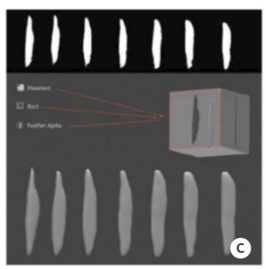
Federico Scarbini is a freelance creature and character artist

Sculpting any bird can be a difficult task, but designing a phoenix can be even more difficult since dealing with feathers is always a tough job, and adapting them to a specific look is more like an ongoing learning curve as you push your techniques and skills. In addition to this, finding a way to sculpt fire and create the transition from feathers to flames is one of the biggest challenges.

I will be describing how to create the base geometry of a feather in ZBrush with the ShadowBox tool, using ZSpheres to create the body and additional design elements. I will also be demonstrating how to use custom brushes and alphas for specific tasks, advanced sculpting techniques and how to tune the Best Preview Render (or BPR) that is new to ZBrush 4 to achieve some of your own hyperrealistic rendered images.

With the new powerful rendering capabilities of ZBrush 4 we are going to compose a final image with advanced effects like subsurface scattering and area shadows. This is a mystical creature so, if following along, don't be afraid to deviate – just let your imagination soar!





Concept
Sketching in 3D

01 ZSphere armature modelling

Using ZSpheres I create a first rough armature for the base mesh. At this stage my main focus is on the silhouette, using references and my sketch as a general guide to place joints in the right positions/proportions. I don't generally use the ZSphere armature to define volumes; I prefer to deal with volume and mass later on using the standard sculpting tools. I pay close attention to the distribution of the polygons by previewing the result in Adaptive Skin mode (hit the 'A' key for a shortcut) Ⓐ.

02 Base mesh rough sculpting

Once happy with the ZSphere base I create the Adaptive Skin version leaving the settings as default. I start working on the base mesh, using the Move brush and Transpose tool. Right now there aren't many polygons to play with so I continue to focus on honing the silhouette and on defining some rough masses using the Inflate and Standard brushes. At this point I start to work on the gestures of the model, trying to match the idea I had in mind for its pose Ⓑ.

03 Feather mesh

Using some feather scans I found on the internet as a guide, I quickly block out some alphas of different shapes in Photoshop. In ZBrush I use the ShadowBox in combination with the MaskRect brush, with Stroke set to Rect, and my feather alphas to draw a mask of the silhouette of my feather; in the side plane I simply drag a thin rectangle to set the thickness. I'm using seven different feather shapes just to get a bit of variation into the subject Ⓒ.

Concept

After some time spent on research and idea collection, I paint a concept of the phoenix I have in mind based on a mix of fantasy elements and real bird references.

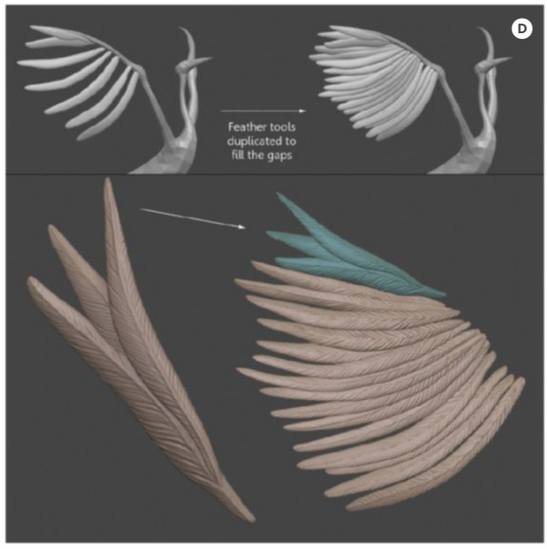
Modelling a phoenix

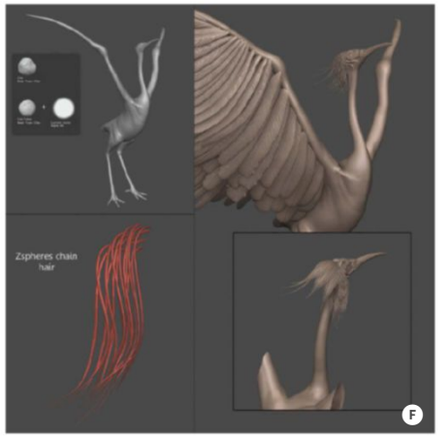
Sculpting on the fly

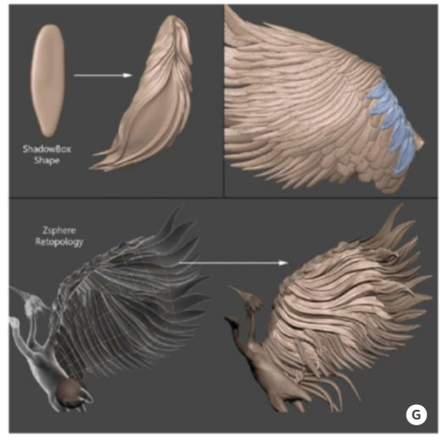
ZBrush 4 workflow improvements

ZBrush 4 has introduced some new features that have really helped in the creation of this piece: generating geometry inside ZBrush is very easy now with the new powerful ShadowBox! Without leaving ZBrush you can create all the base meshes that you need – from easy shapes to very complex three-dimensional objects – just by painting shapes on three projection planes. Other essential additions are the Move Topological and Move Elastic brushes; I used these extensively during my sculpting process when I had a lot of merged SubTools. The Move Elastic brush is great to modify forms without destroying the details and to create mixed variations starting from the same SubTool.

The new rendering system – the Best Preview Render, or BPR – is, without a doubt, one of the best new features and enables you not only to adjust rendering effects like transparency, SSS, shadows and ambient occlusion with very precise control, but also to export all the passes you need to composite your final render in your photo-processing software.







D Using Transpose, the feathers are placed to shape the wing, and then sculpted

E The image shows the multiple layers of feathers required to achieve the complexity of the wing

F Initial blocking of the body masses and head hair construction

G More SubTools are added to the wings to create additional design elements

04 Feather sculpting

Once the feathers are added as SubTools, I use Transpose to place them; I then positioned duplicate feathers to fill the gaps. To sculpt the feather I first subdivide and smooth the original geometry, then with the Standard brush – with Lazy Mouse activated – I place the middle ridge. Once again selecting the Standard brush, I start to define the barbs to try and give them a more random feel. I'm not trying to be extremely photoreal in this piece, as I'm going for more stylised sculpting, trying to simplify the feathers' appearance and give them an abstract finish D.

05 Feather duplication and layering

Once done with the first layer of feathers, I merge the visible feather SubTools (use the Merge Visible button on the SubTool palette) and append the new group to the original ZTool. Then, with the Move Elastic and Move brushes and Transpose, I create more layers of feathers to mimic the bird's wings. Don't forget to vary the feather shapes; you can use the new Move Topological brush to affect just one feather of the merged SubTool. When done, I repeat the same process from Steps 3 and 4 for the secondary wing feathers E.

06 Body sculpting and fur

Using the Clay and Clay Tubes brushes with Alpha 06 I start sculpting the body – using reference imagery as a guide for muscle placement as I block out the masses. For the hair, I use ZSpheres to create a chain and use this as a starting point to create a strand of hair utilising duplication tools modified with the Move Elastic brush. Once I have a completed strand, I duplicate the merged version a few times and layer onto the head. The same process is used for the crest strands at the back of the bird's head F.

07 Additional wing elements

Using the ShadowBox I create the base for some different feathers that are typically shown in traditional phoenix paintings. Using the Standard brush I sculpt hair-like barbs leaving a central eye-shaped part; at first I use a medium-sized brush to define the major lines then, with a smaller brush, I start to carve minor variations. Next I append a ZSphere and use the retopology feature to quickly create a plane on the back of the wings and, using the same method, I go on to sculpt some wavy hair patterns to mimic a stylised flame element, which will be integral for this project G.

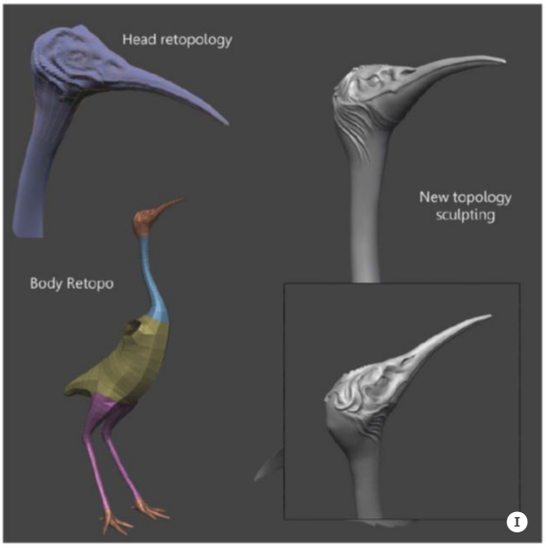
2 hours render time
Resolution: 3,508 x 2,480

08 Final wing layer

To finish off the wings, I add a ZSphere and place it into position before creating a chain that covers the top of the wing (see screenshot). I then convert the ZSpheres to Adaptive Skin mode and, using the same technique described in Step 7, I sculpt some wavy hair that covers the top feathers. I then append another ZSphere and use it to create the other wing decoration that has been placed and duplicated a few times and, with the help of the Move Elastic brush, manipulated to the desired shape H.

09 Head retopology and sculpting

Since the wing sculpting is now well developed, I focus on the head, which is a very important element of our mystical creature. First I retopologise the head to get a better resolution in specific areas, like around the eyes or in the top crest. I append a ZSphere and start to place the new topology, before merging the new head with the original body in Maya using the GoZ plug-in (**www.pixologic.com/zbrush/features/GoZBrush**). Now I have a far better flow of strokes, I can use the Standard, Inflate and Clay brushes to refine the phoenix's head I.



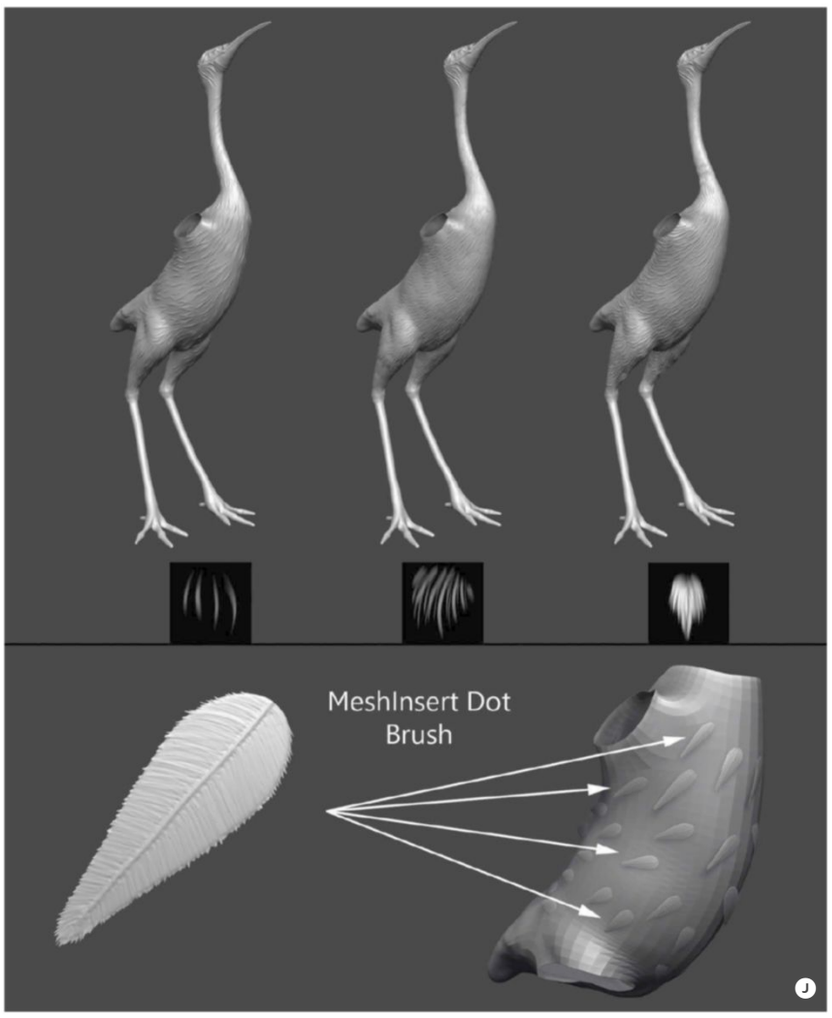
Sculpting fiery feathers

During preproduction, I collected different references of sculpted fire, from realistic to stylised designs. Both have their pros and cons, but in the end I chose a stylised approach because, while trying to capture a chaotic element like fire, it is easier to go abstract and simplify forms to get a better reading of the piece. I knew I would have a technical limit since ZBrush doesn't have adaptive subdivision or voxel-type sculpting, so I decided to divide the common feathers from the fiery ones and tried to blend them together using Transpose and sculpting tools. Blending the feathers was achieved by sculpting the blending section of the fiery feathers like elongated barbs so to better insert the original feather and leaving the stylised fire just at the tips. The fire look I was going for was made by carving fiery spirals with the Standard and Clay brushes and, once the shape was right, polishing the surface with the new Polish brush to give it a more hard-edged look. The goal is to imitate the typical fire silhouette and layering effect by shaping the base as if it was made up of various fire tendrils.

H ZSpheres are used to create fine-detail design elements of the wing

I The head is retopologised in order to get better distribution of the mesh density

J Fur effect achieved by mixing different layers of fur sculpting



10 Body fur sculpting

To create the fur effect on the body I use a modified Layer brush with three different custom alphas; I try to be as random as possible so that once the three sculpts are merged together we are left with a natural, layered fur effect because the meshes act as surface masks for each other. To enhance the effect I quickly sculpt a feather, as previously, and use it as a mesh in the MeshInsert Dot brush to lay down some individual feathers on the torso, before extracting (hiding the torso and using the Split Hidden button in the SubTool palette) and adapting feathers to the surface with the Move Topological brush J.

Breathing life into clay

I use the MatCap tool to capture the shading of a real statue and mix a Fresnel Overlay shader tinted in grey on top to get the final clay look. Using a skin SSS shader on top of the composed clay MatCap, I apply some dark red backscatter tinting to suggest life.

Detailing

Get your flame on

11 Tail and leg details

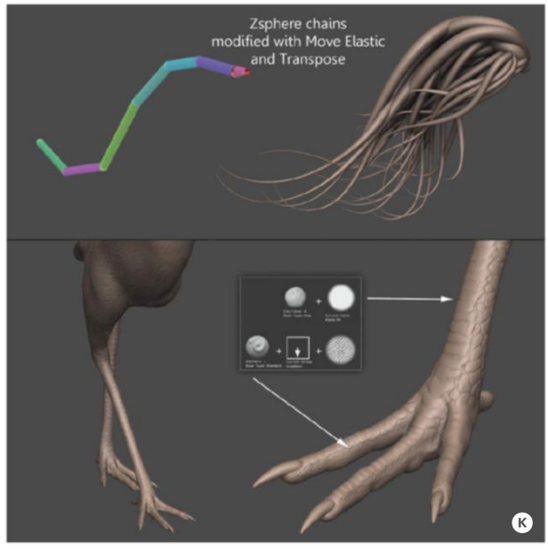
For the tail I'm going for a stylised approach and, once again using ZSpheres, I create a wavy tube mesh, smoothed at the end to taper it. This base is duplicated and randomised with Transpose and the Move Elastic brush. The scales on the lower leg are hand sculpted using the Clay Tubes brush with Alpha 06: to get the overlapping effect I sculpt them in reverse order – from bottom to top – and the Clay Tubes brush takes care of building up the strokes accordingly. For the toe scales I use the Standard brush with DragRect and a scales alpha to speed up the sculpting process Ⓚ.

12 Fiery feathers mesh

To create the fiery feathers I create four different kinds of shapes using the ShadowBox; to create the transition between the normal feathers and the new one I sculpt the latter at one end to look like elongated barbs coming from the original feather, which then blend into flame. To get the stylised fire look I use the Clay brush to first carve a spiral 'tunnel' and then, using the Polish brush, I clean the surface until I get a nice sharp corner where the surface direction changes Ⓛ.

13 Playing with fire

I now place the different-shaped feathers on top of the original ones using Transpose. With the Move Topological and Move Elastic brushes, I blend them in the best I can; Move Elastic is particularly useful when dealing with the tips of the flames to mimic real fire-like behaviour and to create variety. From time to time, I need to resculpt part of the fiery feathers to better fit the new placement and blend using the Standard brush Ⓜ.



Ⓚ Once again ZSpheres are used to create the tail, while standard sculpting tools are used to create the leg details

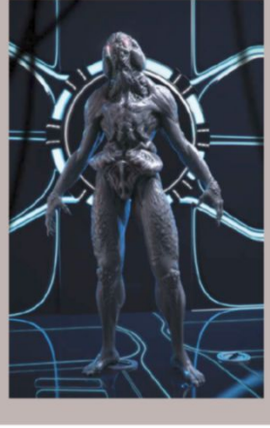
Ⓛ ShadowBox is used to generate the base for the fiery feathers

Ⓜ The fiery feathers are placed and modified with Transpose, while the Move Elastic brush is used to blend

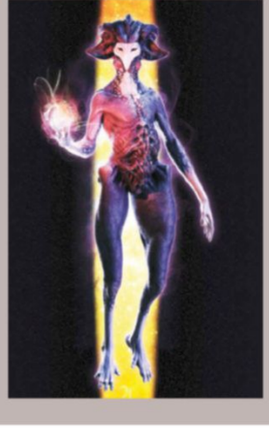
Artist Showcase

Federico Scarbini

I am a very motivated professional, always trying to push my skills, studying anatomy, drawing and modelling that focuses on organic forms and human expression. In recent years I have collaborated with several CG magazines delivering articles centred on high-poly modelling, sculpting and creature design. Currently I'm a freelance character artist based in Italy.



Dark Matter Crusader **ZBrush, 3ds Max, mental ray, Photoshop (2010)** Alien demon from outer space. I focused on mixing alien fleshy patterns with human forms; balancing the two to tell the story of the character was a real challenge



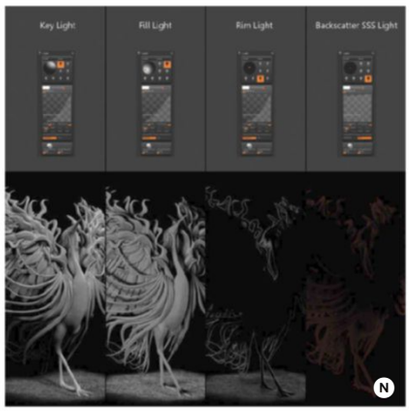
Zenoth, the alien from Jupiter **3ds Max, ZBrush, TopoGun, Photoshop (2009)** A personal design of an alien being. I tried not to fall into any cliché designs, by reflecting a unique behaviour that I thought of during the concept stage

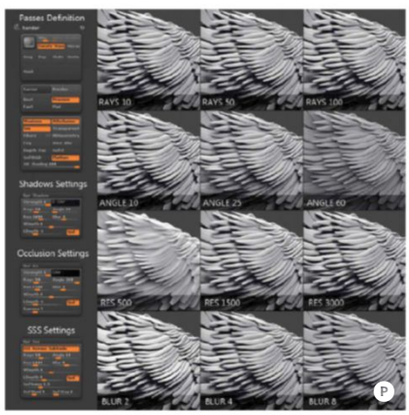
MatCaps and rendering in BPR

Shaders and render settings

14 Creating MatCaps

To mimic a clay texture, I create a MatCap from a picture of a real statue for the base shading, and then I mix this with a Fresnel Overlay shader with a grey tint to create the typical SSS effects you'd expect when dealing with marble. I mix the two shaders by copying and pasting the SH into two different slots in the QuadShader. For the backscatter, I place a Fresnel Overlay shader with a red tint in the s2 slot of the QuadShader and turn off all the other slots. The Reflection MatCap is done by replacing the texture in a MatCap White shader with a fine-tuned ball reflection N.





Zoth 'nothul, the servant of ancient Gods **3ds Max, ZBrush, Photoshop (2010)**
His duty is to preserve the balance between good and evil on the planets by judging the 'normal' Gods' behaviour. Created for anatomy sculpting practice

N These are the settings for the four main shaders, which were used to create the final look of the phoenix

O Values and effect of the four lights used to light the model

P This image shows how each parameter has an impact upon the final result

Q The various passes are composited and tweaked in Photoshop to get the final image

15 Lighting setup

For the lighting I use a traditional three-point lighting approach, placing the Key light in the top-right corner, the Fill light in the bottom-left corner to soften the shadow area of the Key light, and the Rim light against the black background to enhance the silhouette of the model. For the backscatter effect, I use the default ZBrush light already in the eighth slot that is perfect for the effect. I tweak the lights' intensity curves to get a more realistic finish for the light decay O.

16 BPR settings

The final passes I'm using are: the three light passes, Ambient Occlusion, Reflection, two SSS passes (Clay SSS and Skin SSS), a Cavity pass and Depth. The shadow, occlusion and SSS settings share some common tweaks, which are: Rays, Angle, Res and Blur. The last three tweaks change the sharpness and blurriness of the effect, but in different subtle ways; for example, a high Angle value gives blurrier results, but a low Res value gives a similar effect! It depends on the final look that you are looking to achieve; there are no right or wrong settings here P!

17 Photoshop compositing

I load all the different passes into Photoshop and start to compose the final image. First I put together the three light passes, tweaking their opacity and hue. Then I use the SSS passes to create the subsurface effect, choosing Screen and Linear Dodge blending modes. I then add the Reflection pass and a Cavity pass (I use a tweaked MatCap White to get this). The last touches are to add depth of field using the Depth pass as the source with the Lens Blur filter, and to tweak Levels and Color Balance in the adjustment layer options Q.

Create fiery feathers using BPR Transparency

Another approach to creating fiery feathers is using the new Transparency feature inside the BPR. Thanks to the refraction you can get a distortion of the underlying feathers just like you would have when a hot temperature distorts the background. The fire geometry surface will distort the underlying feathers to varying extents according to its turbulence, so try to place details accordingly. You can then composite the two shaders to get a better blending between the flames and the original feathers. Colouring the result will further enhance the effect, as seen below.

Master character design

Creature Totem 2011

> The knife and fork creature was created to be part of a series of 30 characters inspired by vinyl toys

Cesc Grané is a freelance illustrator and designer

Modelling
Lighting
Rendering

Here you'll find a step-by-step guide for the creation of a vinyl toy-inspired character. What's appealing about these popular – and often highly collectable – style of toys is that they are simple, with solid colours, rounded shapes and infinite design possibilities. My characters, which feature many similar attributes, are clearly inspired by these figurines. 3ds Max enables me to easily transform my 2D sketches from a traditional notebook into simple 3D figures, through modelling, lighting and mapping – the basic steps to a 3D creation and the basis for any simple model.

The knife and fork creature discussed here is part of my Totem series. For this project, I made five totems of six characters each, to test my skills in character design.

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Cesc Grané

3DArtistonline

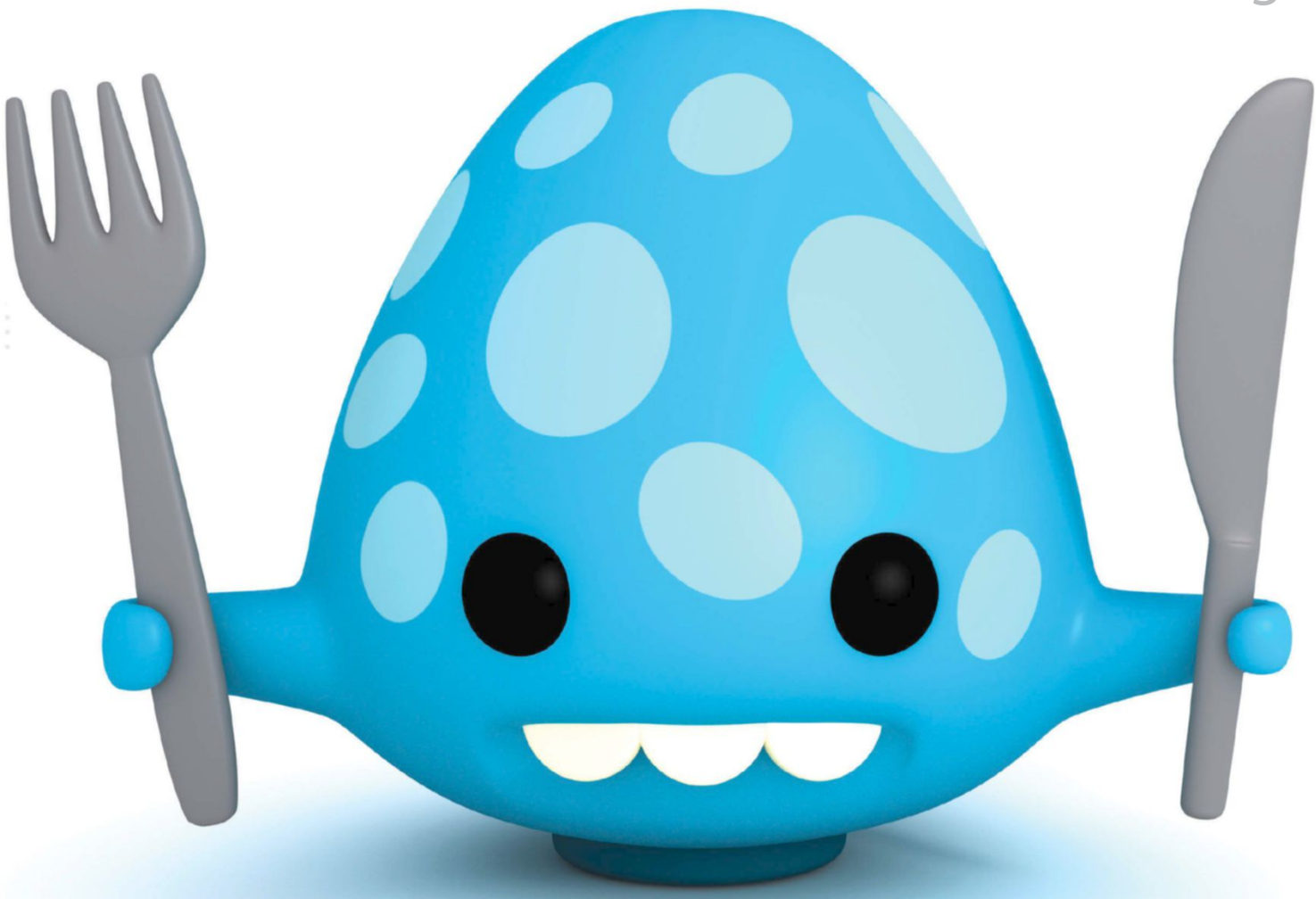
Username: cescgrane

Personal portfolio site
www.ceskills.com

Country Spain

Software used
3ds Max, Photoshop

Expertise Illustration and character design



Concept and shape

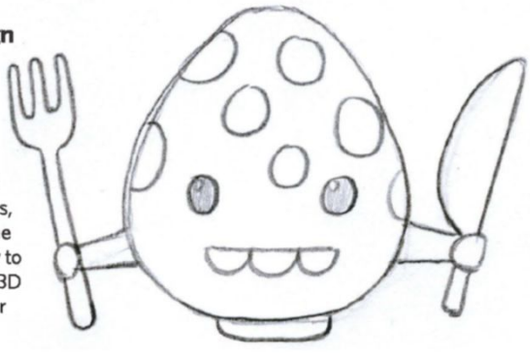
Sketch the character and begin modelling

Software used in this piece

3ds Max Photoshop

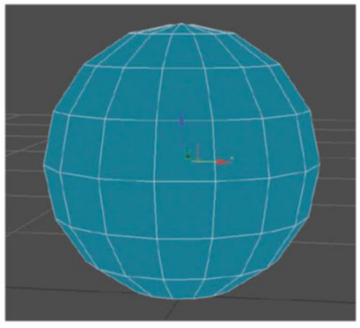
01 Sketch your design

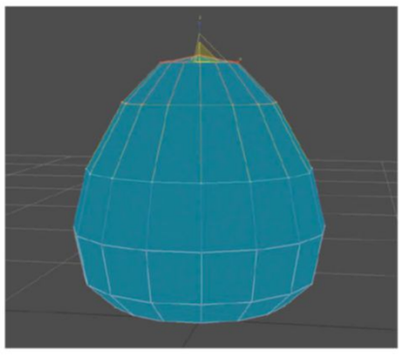
The first step is always to sketch out the character design. I usually visualise it in my mind to begin with, and then draw it in a notebook. The sketch is a reference to me for the shapes, proportions and position of the elements. I don't scan it or try to copy the exact form with the 3D program – my sketches are for visual reference only.



02 Begin with a sphere

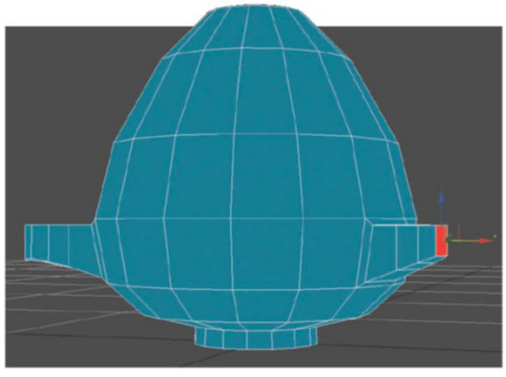
Starting from a sphere of 16 segments, I'm anticipating the location of the elements: arms, mouth, teeth, and the size of the character's feet. I have to keep in mind here that at the end of the process I will apply a MeshSmooth modifier to give the character a general smoothing.





03 Modify the shape

I apply an Edit Mesh modifier to start shaping the character and scale it to the desired shape by selecting the top vertexes. Activating Soft Selection pushes them upwards. It's important here that the polygons are well proportioned, in order to achieve a uniform grid.

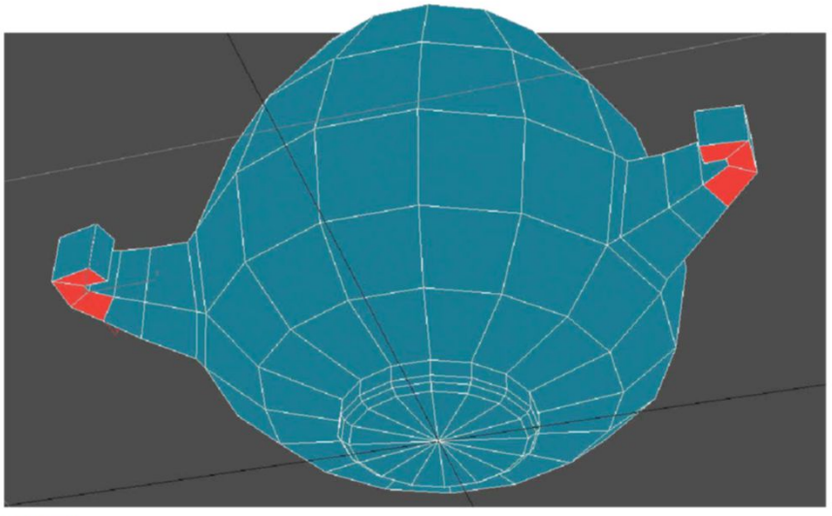


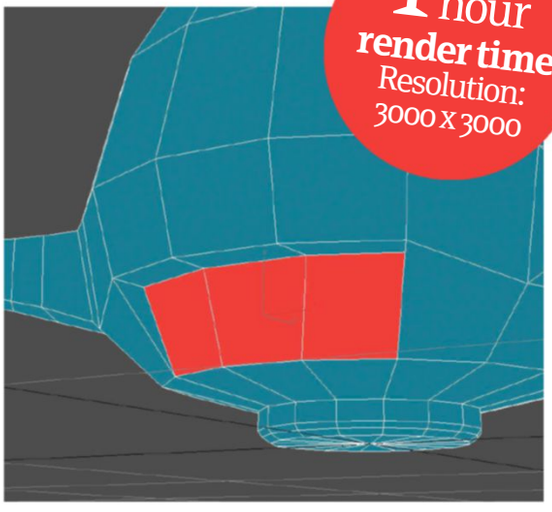
04 Extrude the limbs

Once I have the initial form established, it's time to start building the arms and feet. I select the side polygons, and, using the Extrude option, I elongate and scale them until I get the desired length. I do the same with the foot: I select the lower polygons – the ones forming a circle – and extrude them once.

Define the character & accessories

Complete the character's shape and add the trimmings



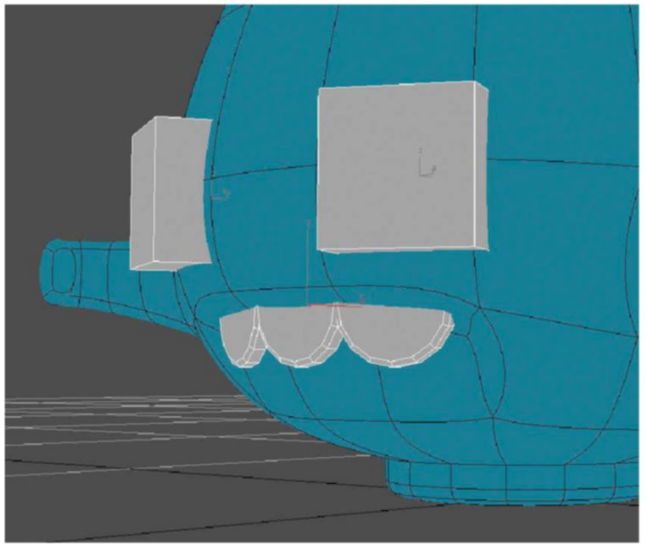


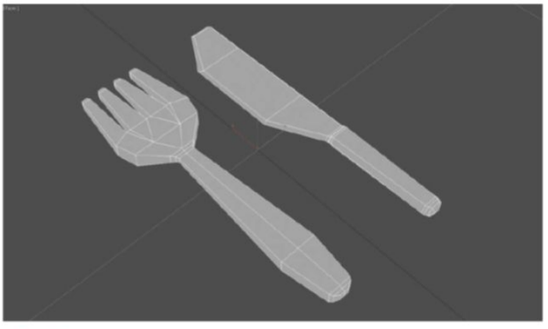
1 hour render time
Resolution: 3000 x 3000

05 Hands and feet It's time to finish these: select the last polygon of the arm and extrude it into a hook shape to create the hand. Do the same with the other arm. For the foot, I select the lower edges and apply a pair of chamfers to round it off. A MeshSmooth of 3 Iterations can be applied to see the end result, and then modify it if necessary.

06 Create a mouth Now the limbs and feet are done, we can model the mouth area. I select the three front polygons and extrude them inwards. I'm interested in making a small gap, so I modify it as shown in the image, joining the lower vertexes. I finally place the top vertexes a little higher up for a better proportioned result.

07 Add teeth and eyes For the eyes, I make two boxes and apply a MeshSmooth of 3 Iterations to create two perfect spheres. Then to make the teeth, I create a 16-sided cylinder, turn it into an Editable Mesh, and apply a small chamfer onto the face side. I also apply a MeshSmooth of 2 Iterations to achieve a more organic-look to the overall form.





08 Grab some cutlery I want the character to be grabbing a knife and fork. To do this, I start from a box as an initial form and extrude the polygons to get the shapes shown above. At the end of the process I add a MeshSmooth of 3 Iterations. When modelling, I enable and disable the Softening option to see the outcome and then go about correcting the form.

Artist Showcase

Cesc Grané

Cesc Grané is a digital illustrator whose work is inspired by Japanese aesthetics and vinyl art toys. His imagination is inhabited by simple characters, which he uses to build particular worlds and to elaborate dreamy and positive stories. Currently focused on the details in his characterisations, he gives each design its own personality.

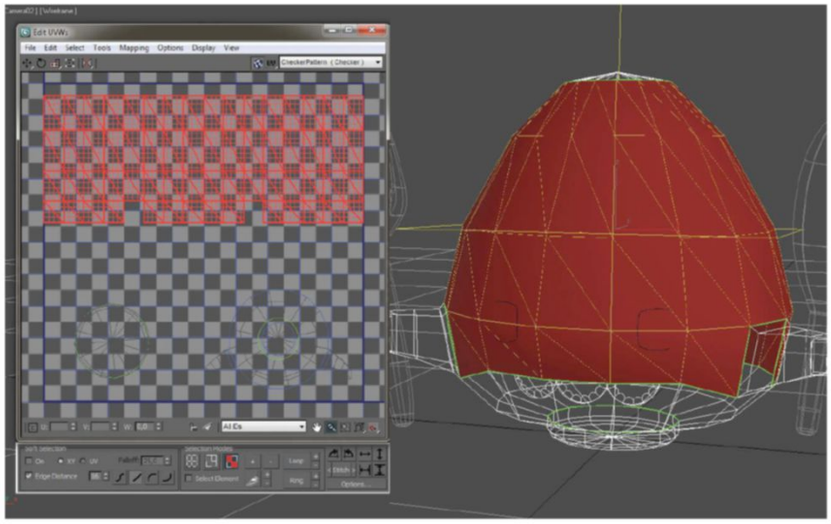
Fujiyama
3ds Max 2010 (2010)
This is my personal tribute to Mount Fujiyama. I often include mountains and volcanoes in my works because of my fascination with the Japanese countryside. Here, I decided to pay tribute to this popular volcano

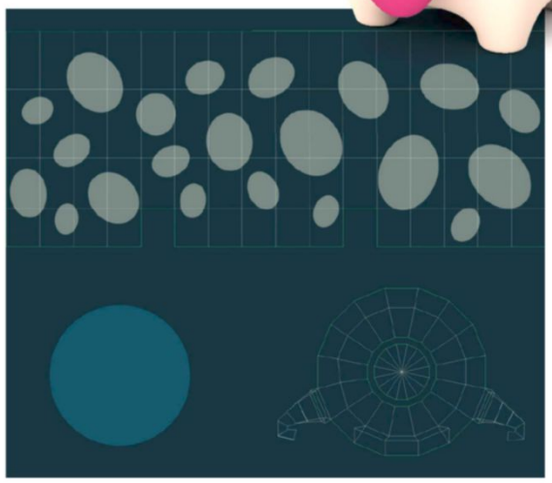
Bigfoot
3ds Max 2010, Photoshop CS4 (2011)
Here we have Bigfoot, with his mushroom friend. These were selected for the Missing Link Research Project – an exhibition part of the 2011 Pictoplasma Berlin Festival

Create the maps, light & render

The final steps to mapping and rendering your character

09 Unwrap and texture At this stage, I place the knife and fork in the character's hands and map the figure using Unwrap UVW to add the polka dot texture. I click on Edit and select the items that correspond to the colours I want to apply to them: the polka dot area, the foot, and the rest of the character.

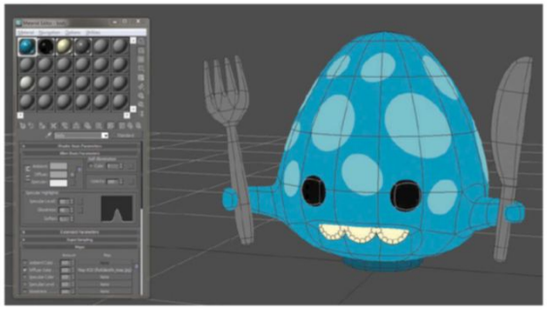




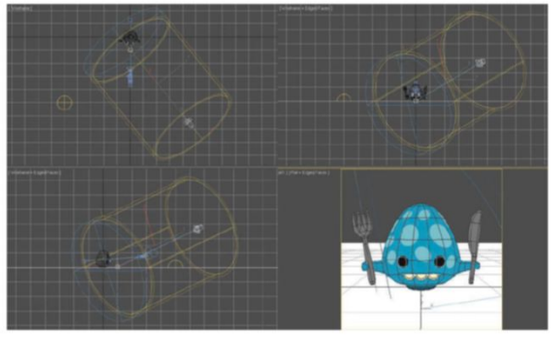
10 Time for colour After rendering the UVW template as a jpeg, I apply the colours and texture using Photoshop. I open up the file, add a new layer and paint it blue. I then create several ellipses randomly along the body, of a yellowish colour with 40 per cent transparency, and on top of the foot I make a rectangle of a darker blue. Finally, I save it as a jpeg.

MeshSmooth

The way I work is by creating objects with a few polygons and then applying a MeshSmooth to them. In order to apply the smoothing only to the rendering, I indicate the number of Iterations in the Render Values. This way, I have less geometry in the scene and it's not as memory intensive. Furthermore, the objects get a more organic and rounded shape that fits perfectly with the style of vinyl toys.



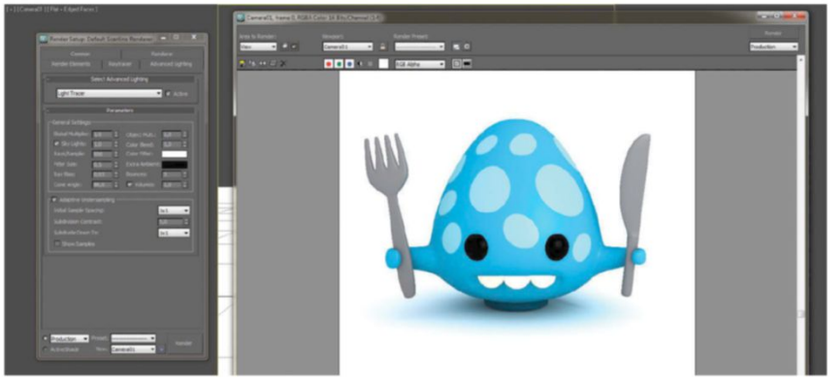
11 Give it gloss I open the Material Editor window, select one material and apply the texture I've generated to the Diffuse Color layer. I then create a material for the rest of the elements and change the colours: black for the eyes, yellow for the teeth, and metallic grey for the cutlery. To give a glossy finish to the final result, I modify the Specular Highlights values, giving a value of 50 to Specular Level and 40 for the Glossiness.



12 Shine some light The next step is to light the character. A camera is placed in front of the figure before adding a Target Directional Light and activating the 'On' option in Shadows. Place it on the right of the object, behind the camera and slightly higher. I then add a Skylight with a value of 1.2 in the Multiplier, and a white plane goes under the character to simulate a floor.

Raiki Boy - The Origin
3ds Max 2010, Illustrator CS4, Photoshop CS4 (2011)
Raiki is a magical boy made of wood. He was created by the energy from lightning in the midst of a mysterious forest. He also has hidden powers, which his friends will help him discover during his adventures...

Raiki Boy is a personal project; to see more visit **www.raikiboy.com**



13 It's rendering time! For the best results, I select Rendering>Light Tracer, applying a value of 500 to Rays/Sample, and 3 Bounces. Finally, I select '1x1' for the Initial Sample Spacing. These values may increase rendering time, but you get great image quality.

Software used in this piece

Maya | Mudbox | Photoshop | V-Ray | mental ray | Shave and a Haircut

Modelling Texturing Rendering

behind the scenes

3D artists explain the techniques behind their amazing artwork

B Make sure you model the bulge in the cornea and that the iris slopes in as shown

D This was all textured in Mudbox using the reference shown on the left

E All these settings are tuneable but wait until you have proper lighting before adjusting too much

Artist info

Dan Roarty

3DArtistonline

Personal portfolio site
www.danroarty.com

Country USA

Software used
Maya, Shave and a Haircut plug-in, Mudbox, Photoshop, V-Ray, mental ray

Expertise I specialise in character-related art. I have worked on pre-rendered and videogame character assets. Sculpting and texturing are by far my favourite but I enjoy all elements related to characters.

Create realistic eyes and skin

The Blue Project 2011

> The goal of this image was to create a realistic female portrait of my wife Nicole and have it look as close to a photo as possible

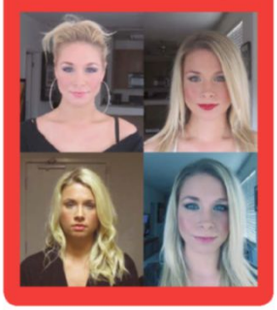
Dan Roarty Lead character artist at LucasArts

In this tutorial I'll mainly focus on how I created the overall look of the eyes and skin for *The Blue Project*. The goal of this image was to create a realistic female portrait based on my wife, Nicole, and have it look as close to a photo as possible. This was a very challenging and risky undertaking to say the least. Fortunately, I remained fairly patient, learned a lot along the way and ended up achieving my goal of a somewhat-realistic portrait.

To achieve these goals, I used multiple pieces of software including V-Ray for rendering (everything except the hair), Maya for modelling, Mudbox for sculpting and texturing and Photoshop for compositing. Over the following few pages I'll spend time breaking down how I created some of the geometry, textures and material settings before touching on lighting and compositing for the eyes and skin. Let's begin!

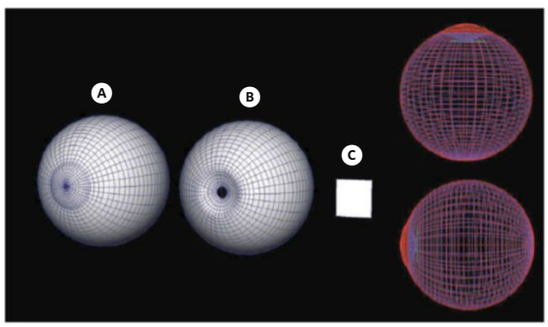
Concept

For this project I relied on photos as a reference to achieve the realism I was after. I gathered pictures of the subject in differently lit environments to help guide the look of the final image.



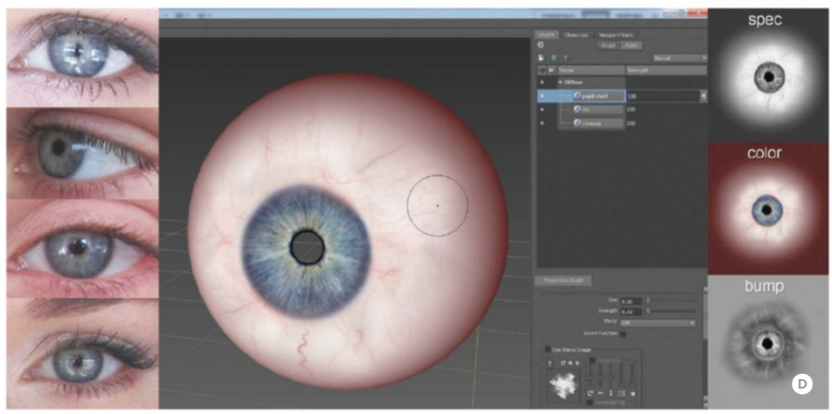
Begin the facial features

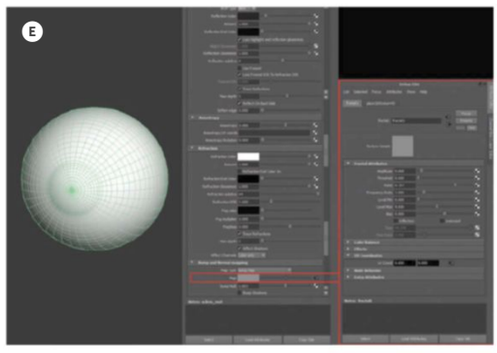
Use references to create the geometry



01 An eye for an eye Let's begin by creating the three pieces of geometry to make the eyes for this tutorial including Ⓐ the cornea Ⓑ the sclera and iris Ⓒ the pupil. For the cornea and sclera, you can start with a basic poly sphere and add the necessary edge loops to achieve the desired look. Be sure to delete the opening geometry of the iris Ⓑ so you're able to see through to the pupil geo. The cornea geo should also be just slightly larger than the sclera as it will sit on top as a transparent piece. The pupil can be a simple poly plane. Once complete, create some UVs for all three pieces of geometry for texturing in the next step.

02 Texture the eyes Time to texture the eyes. Export the sclera and iris geometry and import into your texturing package. I used both photo references of my wife's eyes and hand painting to achieve the final result. Ensure that the opening of the iris where it meets the pupil has a nice black fall off. Bring it into Photoshop, desaturate and adjust appropriately to create both a specular and bump map, adjusting to suit. Ⓓ

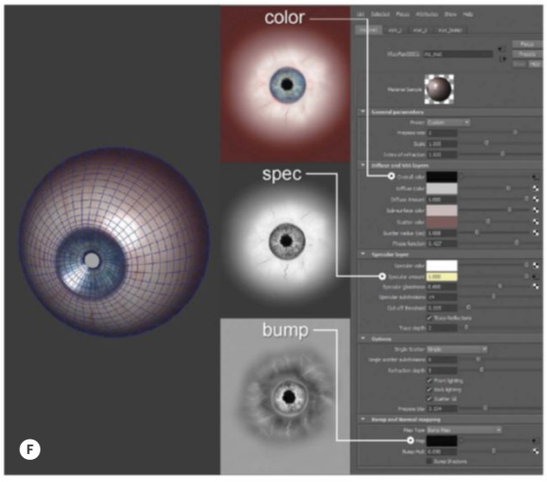




03 Eye materials 101 For the outer cornea we're going to create a VRayMtl, rename it Cornea_mat and adjust so it's translucent, reflective and refractive. Take the reflection colour and bring it just slightly higher than the default black. This will ultimately be our tuner for the amount of reflection. To make it refraction, go down to Refraction Color, turn it from black to white and keep the amount at 1. Crank the Refraction subdivs up to 64. I added a procedural fractal bump map too. Ⓔ

Polish the eyes

Finish materials, lighting and test render



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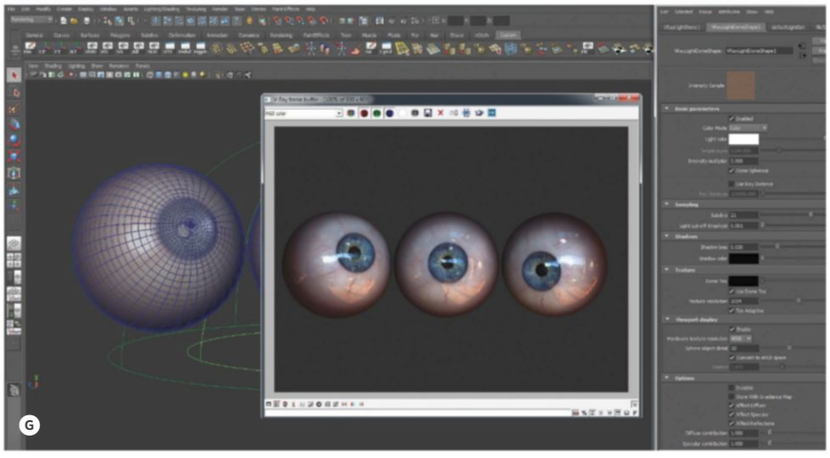
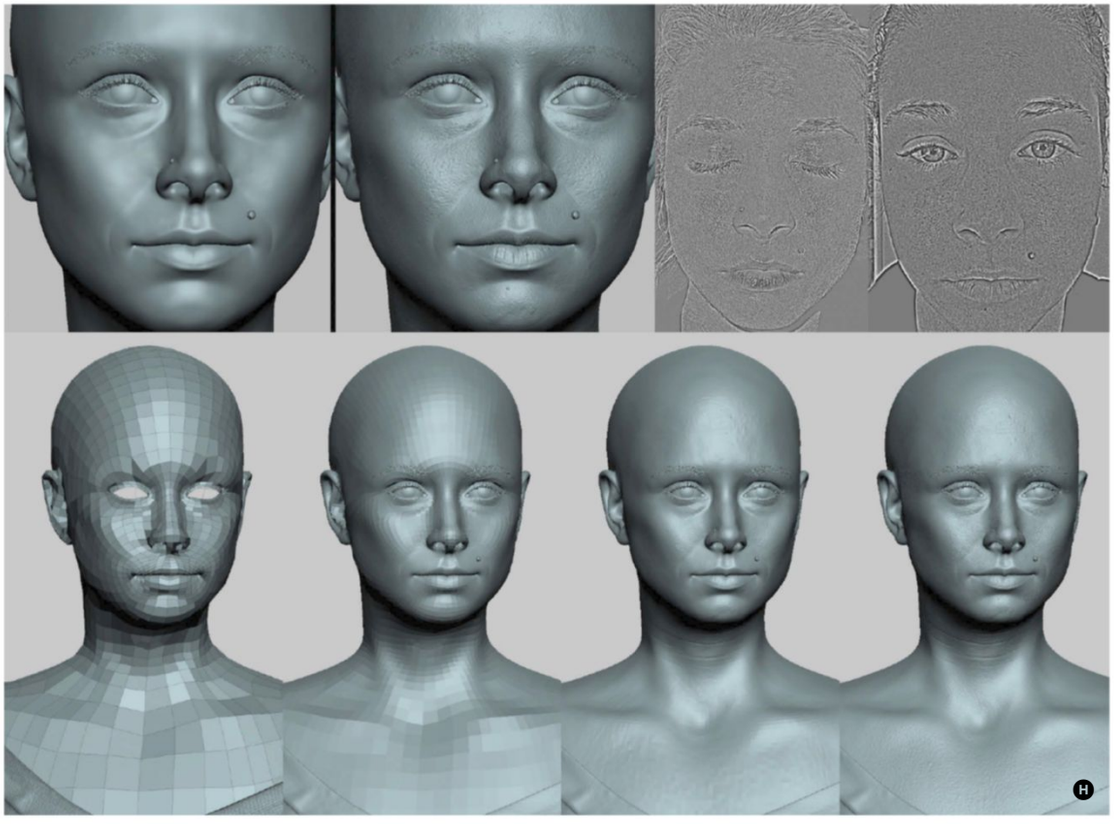


G

04 Material finale For the sclera and iris geo, let's create a VRayFastSSS2 shader, rename it Iris_mat and slot in all the texture maps we just created as shown. The reason for using the FastSSS2 is we want a bit of subsurface to show in the eye. For the bump map, don't go crazy but show that the veins and the iris have surface detail. For the pupil, just create a basic V-Ray material (SSS2 will do) rename it Pupil_mat and ensure that it's solid black with no reflections. F

05 Twinkle in the eye With our eyes complete, let's do some test renders to see how they look. For this step I am going to use a V-Ray dome light with an HDR image as a source that I downloaded from **www.hdrlabs.com**. Once you have your image, slot it into the Dome Tex input and select Use Dome Tex. We will need higher sampling, so turn the subdivs up to around 20 (at least). Now, at the top, select Dome Spherical and try some renders. The Intensity Multiplier can be adjusted as needed. Save the scene so we can bring in our head mesh later. G



H

06 Sculpt the skin On to the head. When sculpting the skin detail it's important to over-sculpt the pore detail to a degree. The reason for this is that when you end up rendering out your image, much of the detail is lost due to the subsurface effect of the V-Ray shader. For this project I took photos and adjusted them in Photoshop so I was able to use them as stencils. I used a combination of both photo references and the supplied stencils within Mudbox. The UVs were very basic and I ended up creating six subdivisions in order to sculpt in the necessary details. H

Problems and solutions

There are quite a few different ways of creating realistic CG eyes, and most of them share quite similar attributes. A major part of creating the eyes is ensuring the textures are realistic when read both from a distance and close up. Using photo references will guarantee that the eye looks as realistic as possible, but it's also important to hand paint areas out such as specular highlights or reflections. Take some time and research close-up photos of eyes, paying attention to how the surface reflects light as well as how it refracts light. Once you have your eyes complete, play with the lighting setup and see how your textures read under different lighting environments. As a test, try creating different coloured eyes as well and see how they look under the same lighting.

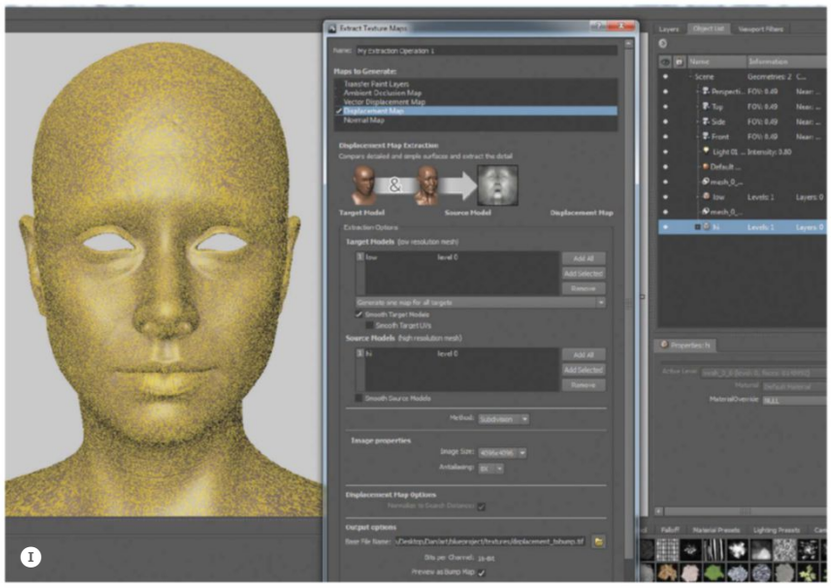
F All these settings are adjustable so use what works best for you

G You can also add an additional light source that affects reflections only if you want to create a highlight

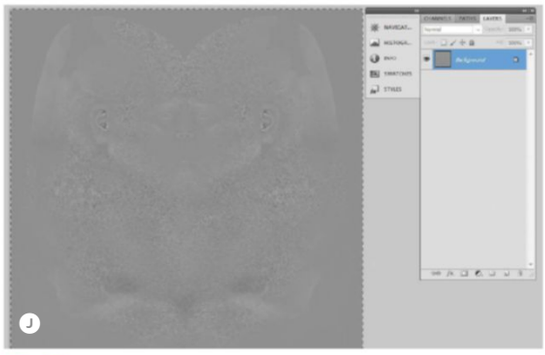
H I used the images shown as stencils and sculpted all the pore details on a separate layer in Mudbox

Skin tone and texture

Develop the colour and look of the head



07 Extract the displacement We now extract a 16-bit displacement to be used later as our bump map (this will serve as an aid to push the pore details when rendering). First, export out two separate meshes. The first will be the highest subdivision (6) and the second will be a couple of divisions lower (4). We don't want there to be any significant difference in silhouette, just slightly less frequency in details between the two heads to extract from. After this we create a new Mudbox scene and import both heads using the settings shown to extract. I



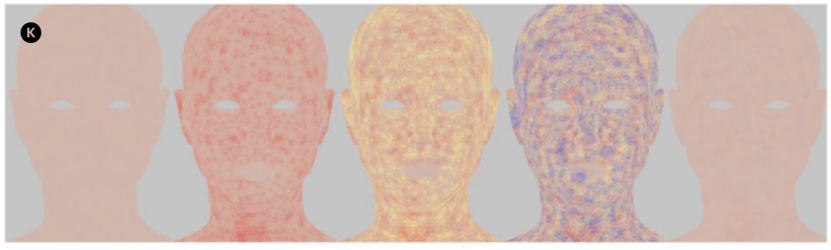
08 Save a bump map Import into Photoshop and take a closer look. You might find small areas that you want to paint slightly or adjust. The final image will be saved out as an 8-bit, but I extract out a 16-bit in case any major levels adjustments need to be made and keep it as the original source. This bump will serve as giving a little extra help to our model detail in Maya so we want to ensure all the details are present in the map. Save out an 8-bit version of the bump and we will test it later on. J

I In Mudbox I found using subdivision as the extraction method worked best for this specific map

J I didn't need to make any major adjustments to this map. The extraction was fairly successful

K I always paint with flat lighting to ensure I get consistent distribution of contrast and colour

L The progression of the head. The image on the far right is a shaded shot from Mudbox



09 Realistic skin tone Let's go back to Mudbox. For texturing the skin, I relied on hand painting in order to have consistent contrast and ensure I didn't get any strange colour variations. We start by creating a flat layer that will act as our rough skin tone. Now paint some slight tonal variation onto the skin so it reads from a distance. This consists of three separate paint layers of yellow, blue and red painted dots from stencils and brushes within Mudbox (or made by yourself). Each layer is set as Soft Light with Opacity between 5 and 10% to find a good balance. K

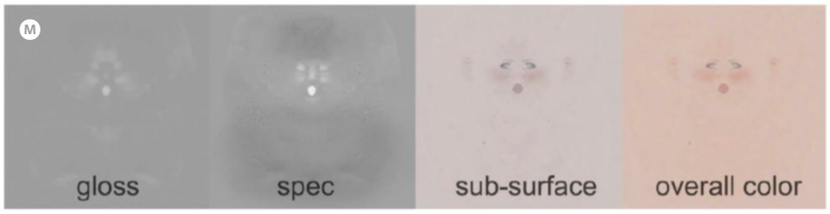
Back and forth

Something to keep in mind while going through this tutorial is that ideally you would be going back and forth with rendering and texturing to fine-tune. This tutorial more or less gives you a breakdown of the specific steps, but you could really do them in any order you feel comfortable. A useful tip I have also found is trying to replicate the basic scene (or goal of what I want to accomplish) with lighting and materials within Mudbox. By doing this you have the ability to paint any of your textures live on layers as well as making adjustments to the model under certain lighting conditions. It's not perfect but does help when you're trying to find a good balance for textures as well as blocking out your shot with models and basic lighting.

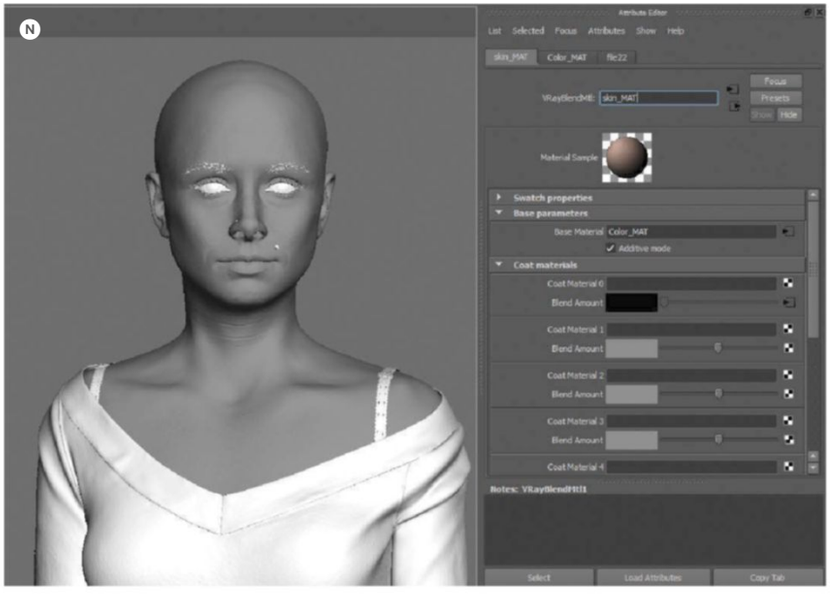
10 Texture the head Continue texturing the head. We start by blocking in the main colours such as the lips, blush and dark eyeliner. Don't go overboard with painting texture information that isn't present in the reference. Having too much contrast and colour variation won't read very well close up when we begin to render (this is another reason I prefer to hand paint the head as it wont get as muddy, which can happen when using photo references). After painting in final details such as moles, blemishes and freckles, we're ready to save the texture. L

Refine the surface

It's a specular, gloss and sub-surface extravaganza



11 Create the spec and gloss We still have three more maps to create; the sub-surface, the gloss and the spec map. The sub-surface map was created by slightly desaturating the overall colour map and tinting it a light blue. The spec and gloss are both created from the bump map we extracted earlier. I took the bump, adjusted the levels and painted in areas I wanted to have more specularity than others. This is something you can go back and forth on once you begin rendering. The gloss is a more simplistic version, blurred so it acts as a general range of highlight tightness. Ⓜ



12 Head material It's time to import the fifth subdivision of the head into the eye scene we saved earlier. When importing an OBJ file, ensure you go to the object properties and under Render Stats check Visible in Reflections and Refractions. Start creating the materials for the skin by creating a VRayBlendMtl which will hold and blend two separate materials, one for colour and subsurface and the other for reflection and specularity. Rename the blend material Skin_MAT. Start by creating a VRayFastSSS2 that will serve as our colour and subsurface. Rename this Color_MAT, place in the Base Material slot of Skin_MAT and click Additive Mode. Ⓝ

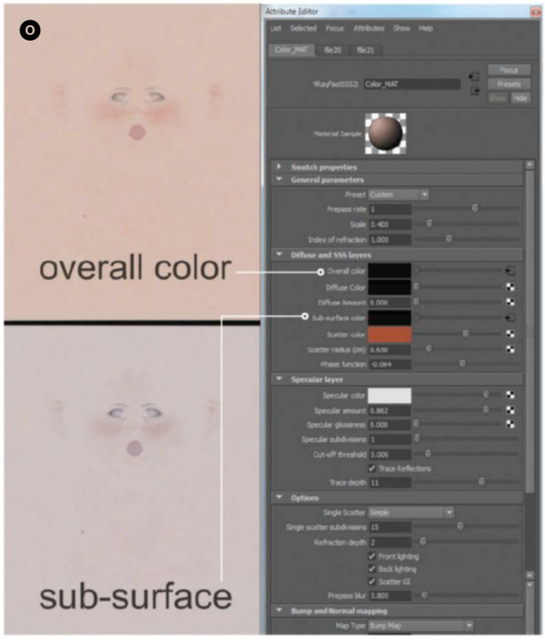
Ⓜ You can see that the bump worked well as a starting point for creating the spec map

Ⓝ We brought a high subdivision of the head in as it won't be animated and Maya can handle it

Ⓞ Nice and easy. Feel free to create a scatter colour map as well

The skinny on realistic skin

Creating realistic skin is something that can drive you nuts when trying to perfect it. A tip I have learned is testing the skin shader under tons of different lighting rigs. Is it translucent enough? does it have enough reflection? With different lighting rigs, hopefully you'll be able to get a better idea where your skin shader stands.



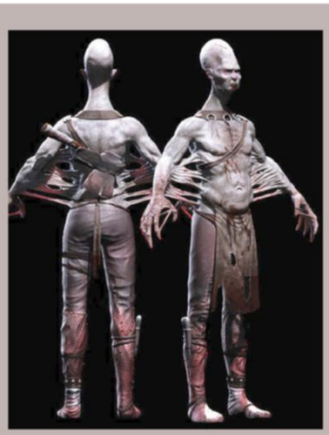
13 Skin material Slot in textures to the Color_MAT. The colour map we created will be placed in the Overall Color slot and the sub-surface map will be placed in the Sub-surface Color slot. For this specific project I didn't create a scatter colour map so I adjusted the tuner to an orange-red hue. All these settings are adaptable and I would recommend playing with them all. You will notice I have the Prepass Rate at 1 (which increases render time), however, if you are testing this can be brought to 0 or -1. Also, ensure Scatter GI is checked on. Let's move on now to the reflective shader. Ⓞ

Artist Showcase

Dan Roarty

I was born in Vancouver, British Columbia, but now live in San Francisco and work as a lead character artist at LucasArts. I've been in the industry for about ten years now and I enjoy sports, food, being outside and working on personal art projects. In the past I have had the fortune of working for Midway, Radical (Activision), as a teacher at BCIT and with 2K Sports.

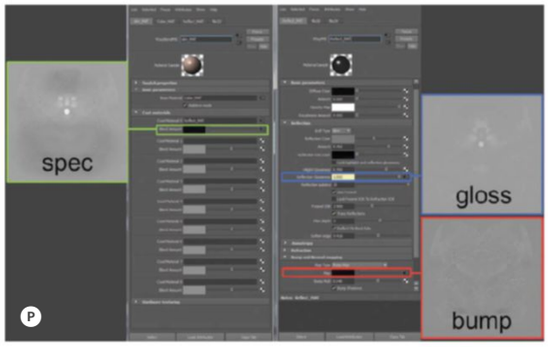
***My Wife Has Gone* Maya, mental ray, Photoshop, Mudbox, Shave and a Haircut (2008)**
An older image inspired by an elderly man I saw one day on the train that looked very lonely. I tried to create a slightly stylised, painterly look to the image.



***The Body Butcher* Maya, mental ray, Photoshop, Mudbox (2007)**
The Body Butcher is an original character design I created years back. The character was the first image I created using mental ray shaders in Maya. A disgusting-looking fella!

Complete the image

Finish with the hair and render



14 Complete the skin shader We start by creating a VRayMtl, renaming it Reflect_MAT and slotting into the Coat Material 0 of the Skin_MAT. We are layering it to act separately as a reflective shader. Now hook up the spec and gloss textures to the Reflect_MAT. We start by placing the specular texture we created in the Skin_MAT blend amount, which controls the overall amount of reflection. The gloss map will be placed in Reflection Glossiness. The bump map texture is also used on the Reflection Shader in the Bump Map slot. P

16 Render and comp Try some test renders and adjust the maps, materials and so on before rendering out your final image. I will render the image out at 2,500 x 2,500 with multiple passes in case I need them later on, however I used the flattened version to start with. I start by importing the flat image of the head and body, then bringing in the hair and fuzz layers which were rendered separately in mental ray. I can tell that I will need to adjust the opacity of my fuzz as it's much too strong at the moment R.

P I found the bump to work much better when slotted into the Reflection Shader

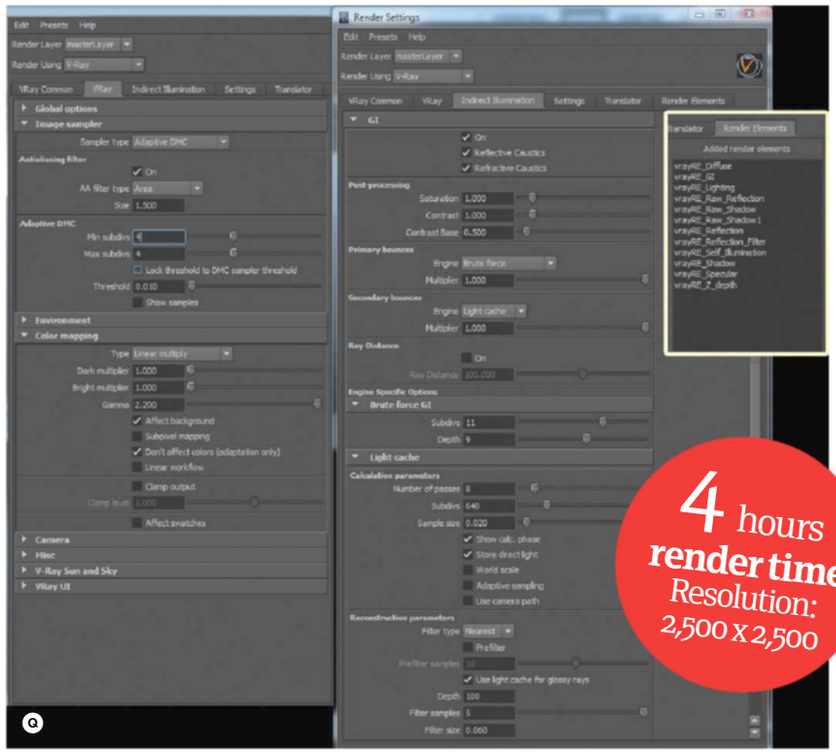
R I rendered the face and shirt fuzz separately from the hair so I could adjust the opacity

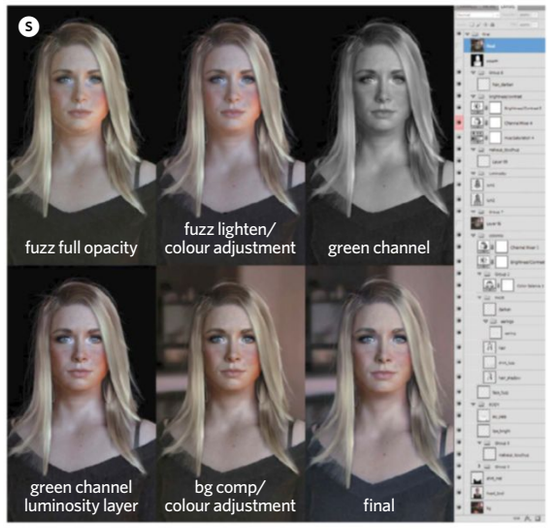
Q Increasing the Min/Max subdivs will increase render time but give better results

S I touched up very little with painting, relying heavily on layer adjustments for colour

***Bobby* Mudbox, mental ray (2009)**
This is a stylised bust of an English bobby I did for fun in my spare time. I wanted him to have a strong silhouette and play with exaggerated facial features.

15 Render setup Let's apply Skin_MAT to our head and look at the basic render settings. All these settings are tweakable, but here's a few tips that may help. The first is to use Adaptive DMC under Image Sampler when rendering and usually bump up the Min/Max subdivs to 4 when rendering a final image. Ensure that under Indirect Illumination, GI is turned on, Primary Bounces are Brute Force and Secondary is Light cache. For Render elements, I have turned on multiple render passes so I can adjust them afterwards in Photoshop if need be. Q





17 Add the background I quickly adjust the fuzz opacity and create some layer adjustments. I look at the highest frequency of detail and contrast in my Channel box (which is the blue layer), copy and paste as a new layer and set the layer type to Luminosity. I have found that this helps to punch some of the values and gives more contrast to your image. Play with brightness and contrast and erase areas that are too hot. From here, I add my background, Z-depth layer and make final touch-ups. S

Practice makes progression

I knew before I started that this project was going to be time consuming and fairly tough. Any time you start a new piece, try to think of what you're going to learn along the way and issues you're going to have to overcome. For me, realistic skin and eyes was a perfect way of incorporating a learning process into creating the *The Blue Project*. Looking back, there are lots of things I would probably do differently and I still feel I have not reached the visual bar I was wanting to hit. That being said, next time I hopefully will... get closer!

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Luis Antonio
3DArtistonline

Website
www.artofluis.com
Country Portugal
Software used 3ds Max, mental ray, ZBrush, Photoshop

Software used in this piece

3ds Max | mental ray | ZBrush | Photoshop

Getting the expression right was the hardest part for me. I wanted to make him feel uncomfortable and in doubt, but still in control

> I find that lighting can make all the difference for a successful image. I tried a couple of different light setups until I could find the right mood using a three-light setup with warm colours

Using one single frontal light gives an intimate interrogation vibe

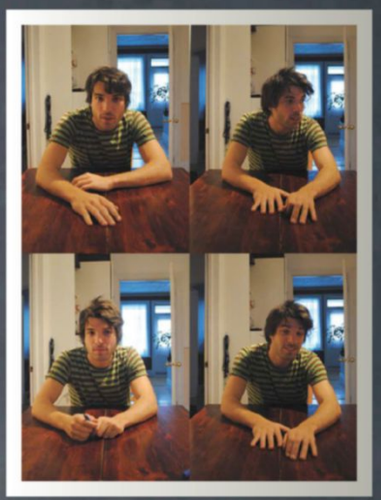
The Interview 2011

My goal was clear: I wanted to create an alien creature to push my anatomy skills and, at the same time, learn the mental ray shading and lighting system. The rest kind of slowly fell into place as I tried to place the alien into a real-world situation. I wanted to make him clearly different from us, but still someone we could connect and empathise with, as well as tell a story with the picture.

> For the final render I ended up placing some white papers to balance out the strong white light spot on the right side of his head

To make the composition balanced for the viewer to read the image correctly, I played with the props and their position on the table to balance the result

> Thanks to ZBrush's Transpose Master and Move brushes I could quickly create several different expressions and see them in real-time until I was satisfied with the result



Whenever I can, I try to get the best references possible for my images; in this specific situation the easiest solution was to photograph myself

> Photographing myself in the same position as what I had in mind for the character, I could create a more realistic pose and have a good reference for the T-shirt wrinkles etc

Futuristic Femme concept design

Post-apocalyptic punk girl 2010

> This is a character concept for production purposes. I used a more refined finish to convey information to the modeller

Kekai Kotaki is a lead concept artist at ArenaNet making *Guild Wars 2*. He also works as a freelance illustrator on book covers and cards

The brief was to develop a character to show what goes into creating a concept before starting on the modelling process. I got a general description of the type of character to create; the basic vibe was a post-apocalyptic, bad-ass punk girl. So after identifying the personality and traits that I needed to bring out in her, I started to work on some roughs.

With all of my projects, I try to bring a sense of personality to my work, so as you'd expect, knowing the genre you are ultimately aiming for is always a massive help. It also helps to know where your client is coming from too so you're on the same page from the very beginning.

Since the job was pretty open ended, I threw in a personal touch and added a Hawaiian influence. This subsequently led to me adding the flag and the Polynesian-inspired tattoos. When creating a character I use the same skillset that I'd use if creating an environment painting. The focus is slightly different, but in general, getting there is the same process. I'm using Photoshop – in this case CS3 – and a Wacom tablet to create the artwork.

Concept

A bad-ass punk, part-Hawaiian chick from the future. I've tried to combine the grittiness of Mad Max with the punk goofiness of Tank Girl…

01 Roughs

I always try to start out as loosely as possible; at this stage I'm only really concerned about the overall design. I quickly add shapes and move elements around, trying to see if different props will help sell the story; it's all about pinning down the most attractive idea. Once I start to see a combination that I like, I'll latch onto it and move forward with refinements. There are also ideas that I bring over from previously unused concepts, because these help to add depth to the new character A.

02 Back and side view

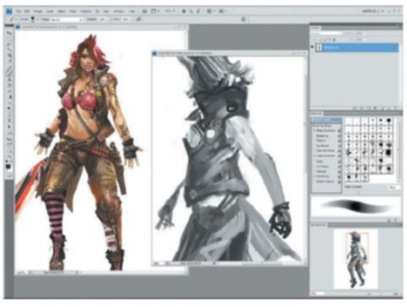
Once I've found a direction that I like, I begin to refine it. I like to work on the front view first; it's here where most of the information is going to be presented. I like to focus on areas of interest – in this case, the face and armour. Once I lock that down I can move on and spread those details onto the other views. About halfway through working on the front view, I quickly roughed in the side and back views B.

03 Polish details

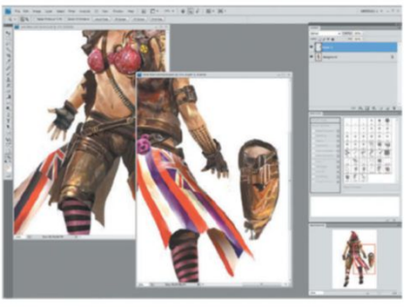
The final thing to do after everything is roughed in is to polish it up and bring up the detail level. Since this is going to be given to a modeller, I try to provide as much detail as possible – though I personally like to sometimes leave stuff a little vague, because I personally think that the 3D artist should be given a chance to be an artist too! But if they need anything more from me, I'm always ready to provide it. You need to have a lot more information about the character in your head than you will necessarily put on the page C.

A

B



C



A Taking a rough in a different direction, using my Smudge brush to block out some hair

B Having completed the front view, I went on to filling in the details to the side

C While honing details, I noticed that I didn't show the far gun, so did a quick view of it

Futuristic Femme concept design

Her hair is on the complicated side to match her personality: locks on the left, wild at the back, and a faux hawk that comes out of the parting in her hair

All metal bits should have a degree of rust. Not only does this provide some colour variation and interest, but it fits with the story too

Since you can't show everything in one view, multiple views are necessary. Making sure your design works across the views is important – I can't slack off the back view because people are going to see it in the model

Her tattoos are of Polynesian origin – particularly Hawaiian – although she may have very little understanding of what they mean. There could be more modern ones too

When posing the character, I try to make sure there is a balance between action and showing information – like the left wrist tattoo, I turned it so it's easy to see

Her bra should be something out of a Victoria Secret's catalogue: very frilly and quite incongruous, in keeping with her mentality

The larger gun should be a revolver; the other one is closer to a Beretta. Look up these guns online for reference

The materials of her clothes should be made out of something tough and durable. She probably sourced many of her clothes from military environs

19 hours design time
Resolution: 37" by 21", 300 dpi

I try to make sure points of high interest are clear and detailed. For instance, I've put more render time into the gun and holster than the back of the leg

I don't really try to render materials exactly. As long it reads as something real, I can explain it or point to a reference photo to guide the modeller

I may skimp on minor details sometimes, but I definitely try to capture the overall silhouette and shape, making sure it's solid across all the views

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Kekai Kotaki

3DArtistOnline

Personal portfolio site
www.kekaiart.com

Country USA

Software used
Photoshop

Expertise Kekai has been working in the games industry for about seven years now. He started to get more into illustrations almost two years ago. He creates high-level concept illustrations, as well as character and creature designs for production

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Gavin Goulden

3DArtistOnline

Username Gavin

Personal portfolio site www.gavimage.com

Country USA

Software used 3ds Max, ZBrush, Photoshop

Expertise Gavin's main focus is on character art (modelling, texturing and rigging) for games on current-generation platforms. He also has a keen interest in creating art pipelines, teaching character art, illustration and toy sculpting

Create the Futuristic Femme

Futuristic Femme game character

"Futuristic Femme is a post-apocalyptic fighter brought into 3D space in order to turn a light on game character creation across various software"

Gavin Goulden is a character artist on *BioShock Infinite* and has contributed art assets in the past to titles such as *Dead Rising 2*, *The Bigs 2*, *Dragon Age: Origins*, *F.E.A.R. 2* and *Damnation*

In the first part of this tutorial, we will be covering the process of building out a base mesh model with the intention of doing our digital sculpting in ZBrush 4.0. With a concept image provided by Kekai Kotaki – explored in depth on pages 68-69 – we will be using that as a guide and attempting to preserve the quality and integrity of the concept within 3D space.

We instantly fell in love with Kekai's concept; a highly detailed character is always warmly welcomed and he managed to capture the dark mood of a post-apocalyptic world while still making the character appealing. The relationship between concept artists and modellers has to be based on compromise, as there will always be elements in a 2D drawing that can't be carried over to a 3D game engine.

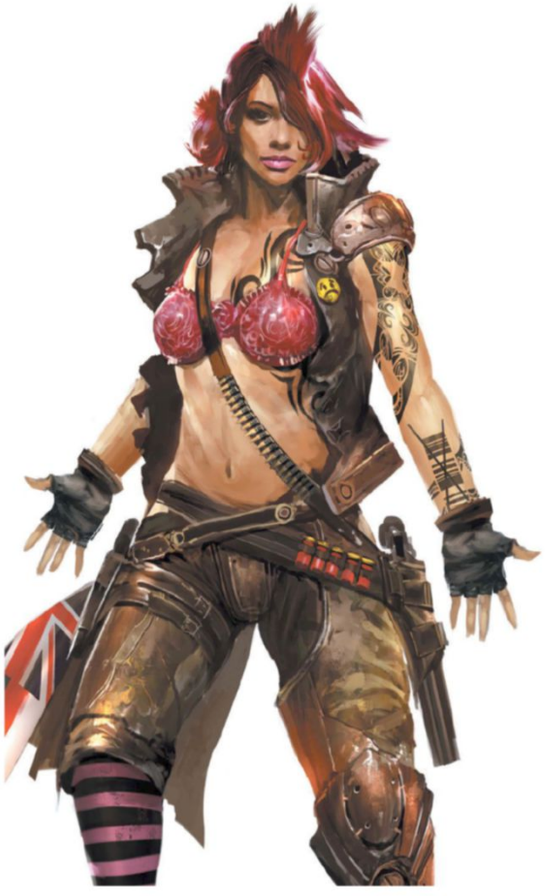
Things such as hair (when using Alpha planes) and overlapping geometry sometimes need to be reconsidered and modified in order to cater to engine restraints. The main goal is to keep the same general proportions as well as the look and feel illustrated in the concept image. Unless you are intending on a 1:1 re-creation like you would see in a sports game, some wiggle room is generally expected.

Troubleshooting

Pin down potential problems

01 Find symmetry

The first thing to do when about to work from a concept image is to analyse the drawing and pick out what spots can be mirrored in the model to save time and to establish what will need to be made unique. Even though this character has a lot of asymmetrical details, the base of the character can essentially be mirrored. We'll model the character split down the middle and then add details such as the shin-guard, bandolier and holsters on top of the basic body.



16 hours model time
Resolution: 3,508 x 2,717

02 Hair: a character artist's worst enemy

A big technical problem, in terms of implementing the character in a 3D game engine, is the hair. The style indicated in the concept drawing involves intersecting planes and planes that curve in on themselves. In order to make this work in 3D, we will need to simplify the hairstyle. Alpha planes that curl over themselves confuse the rendering engine so it does not know which part of the plane is in the front or the back – due to how most rendering engines handle transparency. We'll simply reduce the complexity of the cut while trying to capture the same feeling of disorder in her hair-do.

03 Gunslinger

The *Futuristic Femme* is armed with two pistols, a personalised revolver and a more modern sidearm. For simplicity's sake – and to save on our final character budget – we will only be modelling the guns in their resting position, ie we won't fully model them out as if they were usable weapons.

Generally, weapons in games are modelled separately and handled as standalone assets. The reason for this is that if there is any zooming in on the weapon etc, its budget can be slightly higher without weighing down the actual character mesh and texture space.

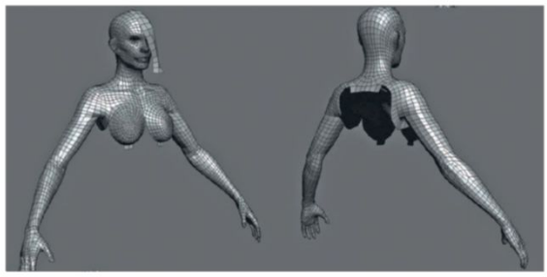
Modelling the hair

Since we are using Alpha planes for our character's hair, we will not need to consider it for sculpting. However, this doesn't mean that we shouldn't consider the logistics of the hair setup at this stage.

Most rendering engines for videogames will render hair based on which plane is closest to the head first and expanding out to the plane that's furthest away from the skull; so, this creates a layering effect. If a plane loops over itself, like in a flipped or curly hairstyle, the rendering engine becomes confused and doesn't know which section is closer to the skull. So, the end result is usually odd chunks of transparency that are obvious errors – such as being able to see straight through the character's head. To avoid this, I build in layers of geometry. Having a broader hair cap closer to the head that has very little transparency and expanding out until you have finer, more detailed Alpha planes further away from the skull. Generally, for curly-haired characters, the chunks of hair will be modelled out as solid geometry to avoid this problem. This method, at least by today's standards, is usually referred to as 'helmet hair' as it is a solid model on top of the character's head and is usually reserved for lower budget characters that don't require as much attention to detail.

Model the base mesh

Creating a model for sculpting in ZBrush



04 Model for sculpting

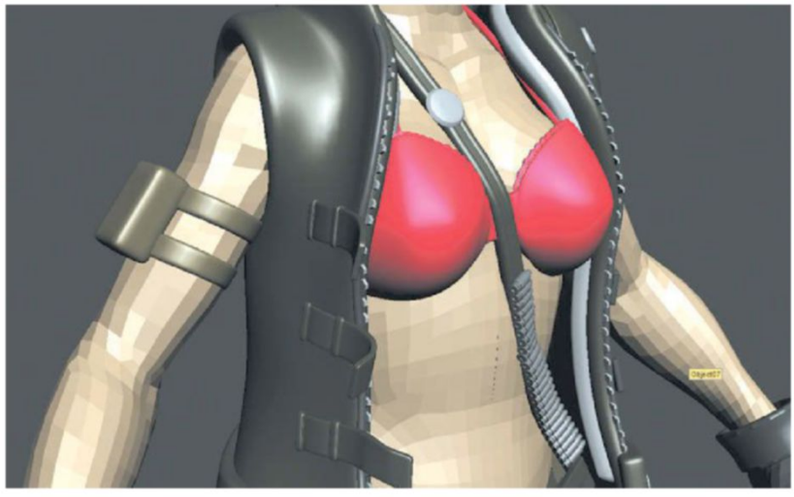
We use the edge extrusion method for modelling, which means that we grab edges of the 3D model, duplicate them and move them in the direction that we want the edge flow to follow. Any method works just as well; the key thing to remember when modelling a base mesh for sculpting is to keep the mesh clean. This means no – or as few as possible – triangles and an evenly proportionate mesh density. The reason for this is that when a mesh subdivides, it subdivides uniformly. If a polygon is noticeably longer than another, it will not divide as evenly as one that is a perfect square. So, when it comes to sculpting time, this will become a problem that requires further subdivisions to prevent jagged or blobby results.

05 Model in layers

When modelling a base mesh, we tend to work in layers so that pieces can easily be adjusted independently. So, even though not all of the upper torso will be visible in the final game-resolution model, modelling at least a rough torso can act as a guide for the gear to go on top of as well as fill any holes in the geometry that may become visible if, for example, our character's vest becomes altered. This is also a wise step to take if dealing with a management system that may require changes down the road – preventing you many future headaches.

06 Handle the hard surfaces

Hard-surface modelling can be a lot of work and we find, with a more dense base mesh, we can retain the basic shape of the model and focus just on surface detail such as bolts and scratches. Good examples of this in *Futuristic Femme* are the metal holster on the right-hand side and the shin-guard. We model the majority of these objects fully and will subdivide them once or twice in ZBrush to add final surface detail.

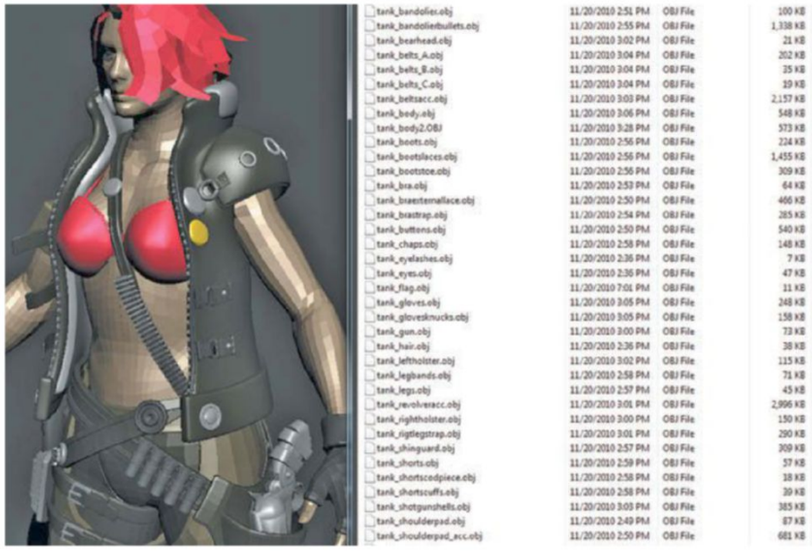


07 Artistic liberties

Sometimes during the modelling phase details can be added that aren't necessarily shown in the concept drawing. Things such as buttons or zippers can add some visual interest to the model and not affect the model's silhouette or destroy the integrity of the character. Examples in this character are the minor vest details like the zipper, straps and even in the inner lining; all details that aren't specifically highlighted in the concept but add points of interest to the model that aren't too distracting.

08 Colour coding

In most 3D packages, you can select objects depending on the material that is applied to them. We create unique materials that resemble what the textured version of the model will look like. This helps visualise the final product but also helps when selecting objects to export.



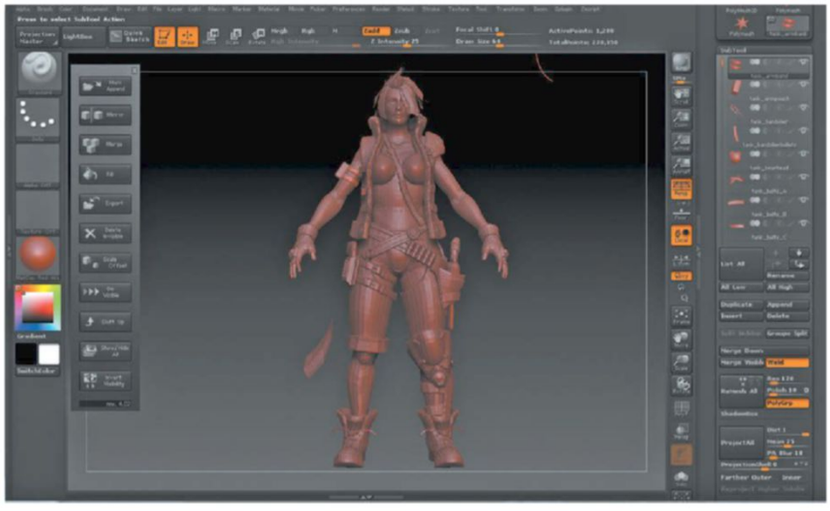
09 Export the objects

We work with a lot of SubTool models in ZBrush. For this character – with all of the straps, overlapping details and buckles, etc – we end up with around 50 SubTools. Obviously, this can get confusing as there are a lot of files to handle. In an attempt to think ahead, when we export, we try to maintain a naming convention that makes models easy to locate, select and edit. In this case, we try to group as many things together as we can, such as the vest (vest, vest bottom, vest collar, etc).

> We tend to set up our hotkeys and brushes before working… Hotkeys can be assigned by holding Cmd/Ctrl+Opt/Alt, clicking on the item you want to be keyed then pressing the key you'd like

10 Import objects into ZBrush

We use SubTool Master (a free plug-in provided by Pixologic) to import all of our SubTools as, again, we tend to have many different pieces on the go. By using the Multi Append feature you can select multiple objects for import. All of the SubTools are listed alphabetically, so, if a naming convention is used that adheres to an alphabetised method, all of the SubTools should be imported and listed in relative groups.



ZBrush settings

ZBrush is an incredibly powerful app that has changed the way many artists work. The program, straight out of the box, is easy to use and customisable. We tend to set up our hotkeys and brushes before working and have them tailored specifically to how we work. Hotkeys can be assigned by holding Cmd/Ctrl+Opt/Alt, clicking on the item you want to be keyed then pressing the key you'd like. For example, all of the brushes we use are assigned to our number keys – just like the weapons in a videogame!

The Standard brush is your most common tool; be sure to assign the Stroke Pattern to Freehand rather than Dots for a smoother brushstroke. Also, if you are using Lazymouse, be sure to set the smoothness of the brushstroke higher than the default setting under the Stroke tab.

We also use a few custom materials that are downloaded from the Pixologic website. There are generally 'working' shaders and 'display' shaders. As in, some shaders are better to sculpt with as they show lighting information more clearly, while other shaders are better suited for rendering where you need to achieve a certain effect.

Artist Showcase

Gavin Goulden

I have worked in the games industry for nearly six years and have contributed to multiple titles across various genres such as sports, shooters and role-playing games. I am currently a character artist for Irrational Games on the title *BioShock Infinite*. Before this, I was a character artist for Capcom on *Dead Rising 2*.

Fallen Empire: Legions

The Bigs 2 – Evan Longoria Screenshot

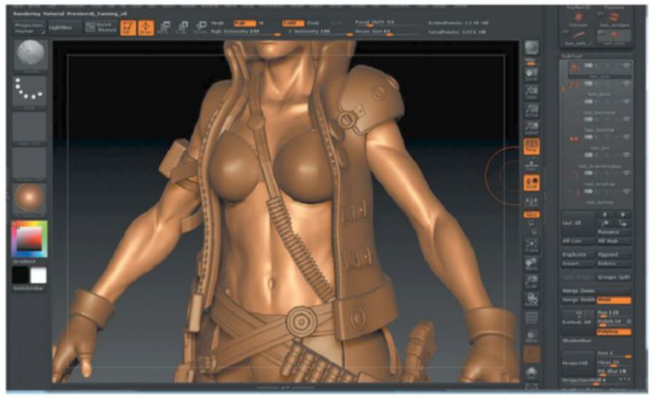
The Bigs 2 – Grady Sizemore Beauty Render

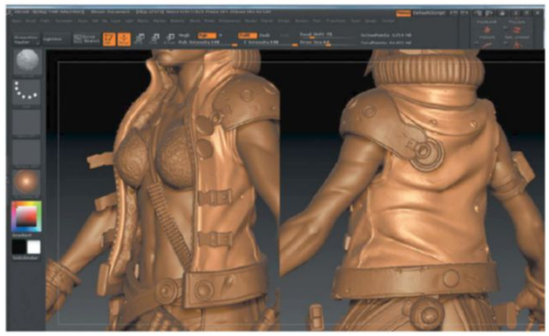
Sculpt in ZBrush

Creating low-frequency detail, with digital sculpting

11 Define muscles & female anatomy

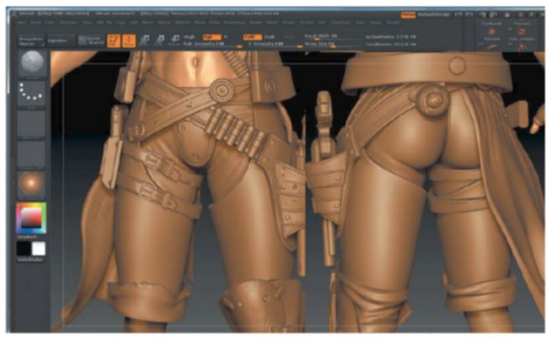
The first step we take after diving into ZBrush is to tackle the flesh parts of the model – mainly the face, chest and arms. The key to modelling females is subtlety. Too harsh lines and over-emphasised anatomy (such as shoulders, biceps and the jaw) can lead to a very masculine effect. So, we try to hint at details rather than really push them to an extreme – like this character's abdominal muscles and collarbone. For *Futuristic Femme*, we wanted to combine a notion of strength with a feminine finish.





12 Sculpt the vest

The character has a very heavy-duty, almost-military-grade leather vest. Generally, bulky leather clothing like you would see in an older padded biking jacket doesn't flow and is rather stiff, so the folds need to show a lot of weight and thickness. To accomplish this, we create deep and shallow folds to hint at the material's stiffness. Try not to go too overboard with the wrinkling on a material such as this as, due to the structure of the fabric, it would mostly be surface details such as creasing. Try to keep the wrinkles in a spot where the body would bend.



13 Sculpt the trousers

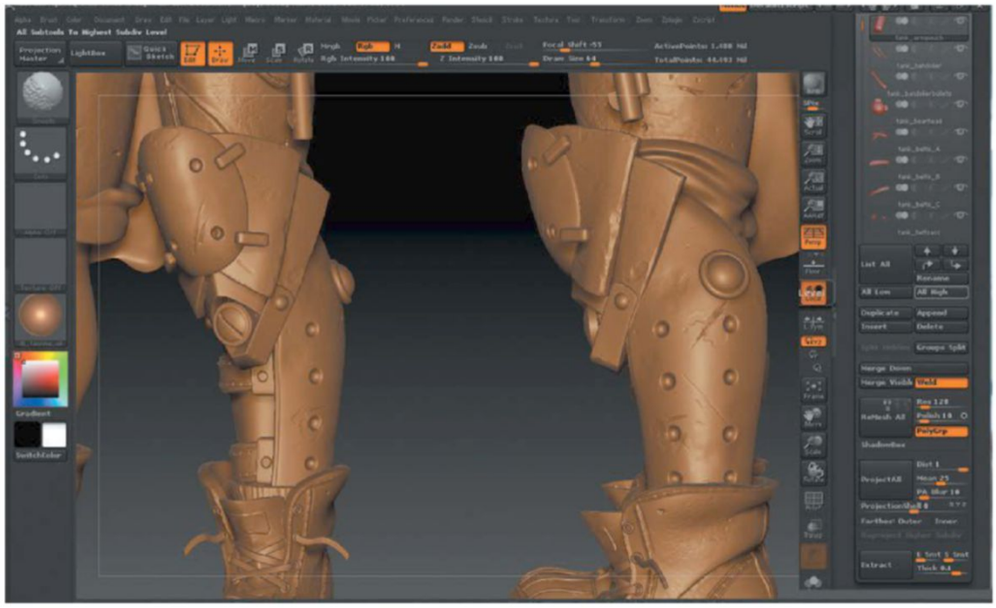
Unlike the vest, the trousers of this character are very tight fitting and will have sharper and tighter folds to show this. We try to keep the folds where the model would naturally deform, ie around the crotch. We also add some smaller stress lines showing where the gear may affect the material such as the gun-loaded chaps compressing the trousers inwards.

Fine detail

As a sculptor, it can be very tempting to add a ton of detail to your model. Things such as skin pores and fine wrinkles are considered high-frequency detail. While this level of detail can be great in terms of eye-candy, it can actually cause problems when it comes to turn this detail into a texture. Normal maps represent lighting information within a 2D space, so, the amount of detail that can be shown is restricted to how many pixels are in your texture. If there is too much detail for the texture, the end result can turn out muddy with elements blending together and becoming lost.

14 Mask out and inflate details

To create raised detail that conforms to certain shapes that have already been defined, we mask out the areas by holding down Cmd/Ctrl and painting the detail onto the mesh. This creates a mask that will be excluded from the effects of a brush or, if inverted (hold Cmd/Ctrl and click off of the mesh) will be the only area that is editable. After the mask has been made, we run an Inflate brush over the area to make it pop off the surface. In the case of the treads on the sole of the boot, we simply lower the subdivision level and shift the geometry slightly using the Move brush.

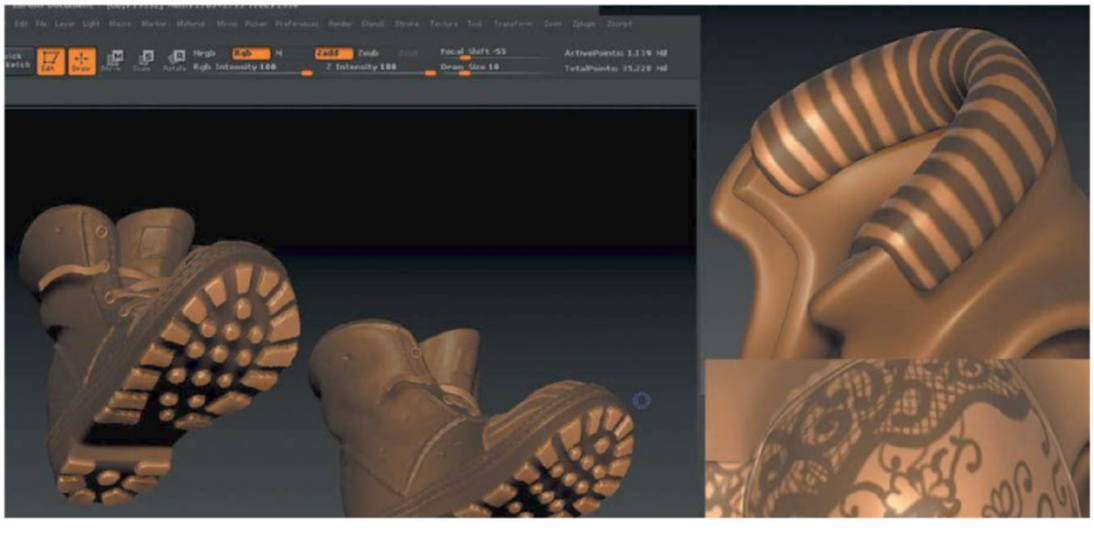


15 Refine organic materials

Detailing organic materials can be a lot of fun and add that final touch to your character models. Regarding this character's clothing, we focus on seam work and realistically aging the leather. For the seams, looking for more than just the Standard brush, we use a custom alpha for stitches using a 'stitch' brush that comes with ZBrush. The alpha is simply a white rectangle, blurred, on a black background. For the leather aging, we use a Clay brush with a soft round alpha and a 'spray' stroke. We set this to a low opacity and later smoothed it out. We also consider that this character would have either salvaged her gear from fallen opponents or have been wounded in one of many battles, so we add a few bullet holes, scuffs and scratches with the basic Standard brush.

16 Detail hard-surface materials

We try to keep the detail on the hard-surface sections of the model fairly basic. Too many dents can make the metal look crumpled and fairly weak. We want to focus on general wear and tear such as scratches and divots. In the case of the shin-guard, we also add the ventilation holes on the side. Detail such as this could also be added with floating geometry or by having the holes cut directly into the base mesh; but we find this method is much less time-consuming and easier to change if necessary.



Software used in this piece

3ds Max · xNormal · ZBrush · Photoshop

Source files available

Find the Futuristic Femme game-resolution model and a range of texture files

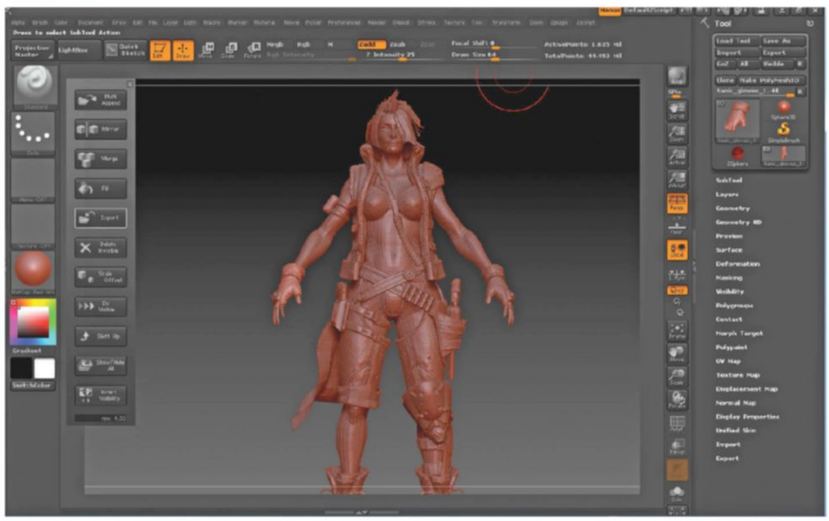
Now that we have created our high-poly character sculpt throughout the previous few pages of this bookazine, it is finally time to build a model that a game engine can handle, and to extract information from that model (such as Normal and Ambient Occlusion maps) in order to assist with texturing and material setup.

Textures can truly make or break your character so it really is essential to get them absolutely right. Diffuse textures with too much lighting information can completely destroy any work that you may have done creating details in your high-resolution sculpt. Flat textures can give your character a cartoon feel, while too much detail can make the character difficult to read.

In the following part of the *Futuristic Femme* tutorial, we will be bouncing through a few different programs to really diversify your CG modelling skills, including ZBrush, Photoshop, 3ds Max and xNormal. This pipeline will show you a comprehensive texturing process for not only re-creating this steampunk-style gal, but one that you can go on to use for all of your game-resolution characters.

Work up the model

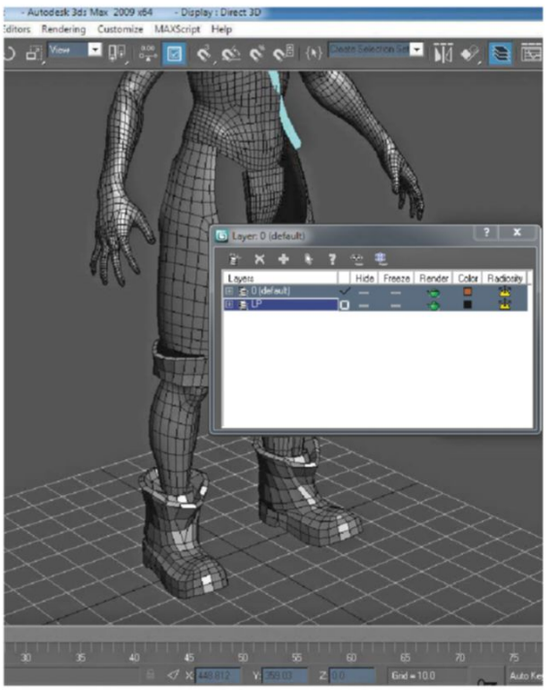
From ZBrush to 3ds Max



> Textures can make or break your character… Flat textures can give your character a cartoon feel, while too much detail can make the character difficult to read

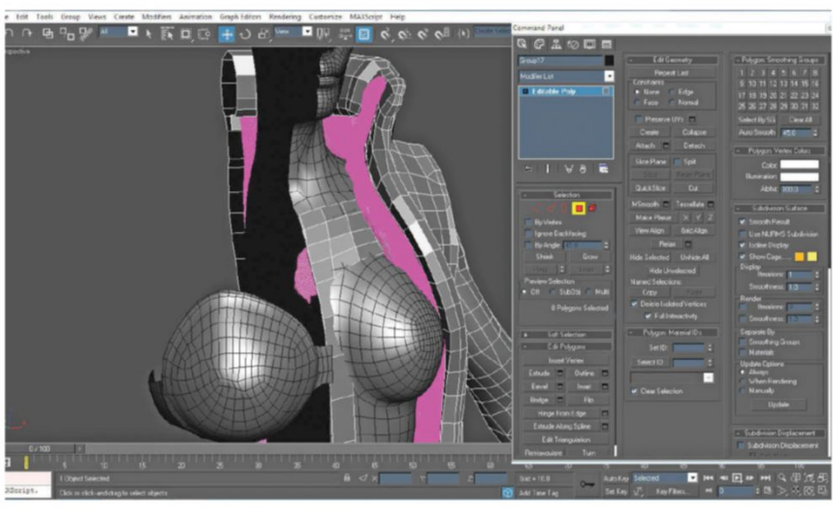
17 Export guides from ZBrush

When starting to model the game-resolution character, we export a medium-resolution version of the character from ZBrush to use as a guide for the new mesh. Some parts (such as the arms and face for this character) can be completely salvaged thanks to the detailed base mesh and only require slight adjustments in 3ds Max. But for the most part, it's important to use any models sculpted in ZBrush as purely a guide to build up from rather than your final mesh as the dimensions of the two meshes will alter greatly and confusing the two will cause problems when it comes to baking. Mass export via the SubTool Master plug-in, giving all elements a prefix such as 'Med_'.



18 Make life easier with layers

Using this method requires a lot of different objects to be imported into your 3D application (3ds Max, in our case), so to make life easier, it's always a good idea to set up a layer just for the low-poly meshes (usually titled something relevant like 'LP') and to add low-poly meshes to this layer as they are created. This offers the ability to quickly control the visibility of the game-resolution model compared to the model taken from ZBrush.



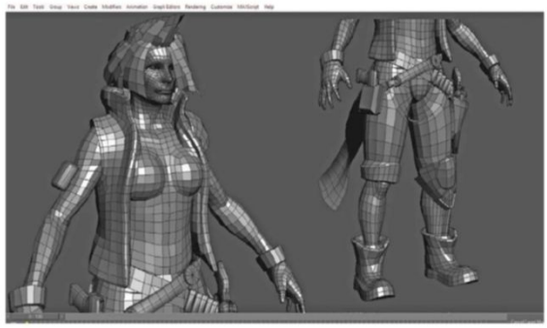
19 Edge extrusion method

In this instance we decide to model using the edge extrusion method. This means that you simply create a polygonal grid, grab an edge, duplicate it and adjust it to follow the lines of motion you want in the topology of your character. We also work with full symmetry until we absolutely need to make one half unique for asymmetrical details. As you can see in the screenshot (right), we're using the head model exported straight from ZBrush as the game-resolution model and utilising the edge extrusion method to build over the character's breasts and clothing – using a fairly dense mesh exported from ZBrush as a guide – more or less 'tracing' the sculpt with a lower density polygonal mesh.

Set yourself a budget

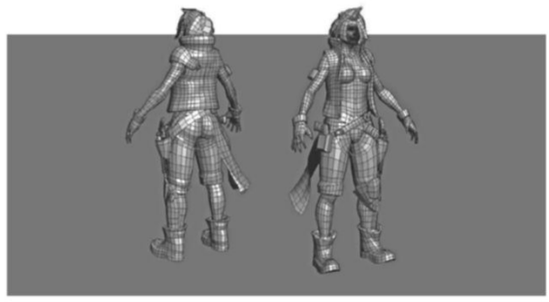
Some budget considerations need to be made when creating a game character. Generally, hero characters will have a higher polygon limit, texture size and material count than your average 'guy on the street'. The reason for this is that more focus is given to them, they often occupy a large portion of the screen at all times and can – therefore – be wrapped into a total scene's budget constantly. More attention is also given to certain aspects of the character such as hair and gear which will add to the total weight that the character will place on the hardware.

With today's technology, geometry isn't as big a worry as it used to be. Obviously, it is best to use as little as possible to get the best results, but it is not uncommon for hero characters to weigh in at 15–40,000 triangles – with characters in fighting games being even heavier. A bigger concern, however, is texture memory and usage. Having a large amount of materials working on one character can bog down rendering time and should be a major consideration whenever adding a new material to your model. In general, the maximum material count that you should look to use is three, with your average character most often only requiring one.



20 The importance of 'clean' topology

When it comes to game models, an important thing to keep in mind is topology – how the edges flow and terminate along your model – and how it will deform once rigged. Leaving enough edge loops surrounding joints and maintaining an edge flow that will follow the underlying bones of a character is key. In this case, we have left at least three loops for exposed joints and are using the benefits of material change near some joints (namely where the vest meets the arm and where the gloves meet the character's fingers) as termination points.

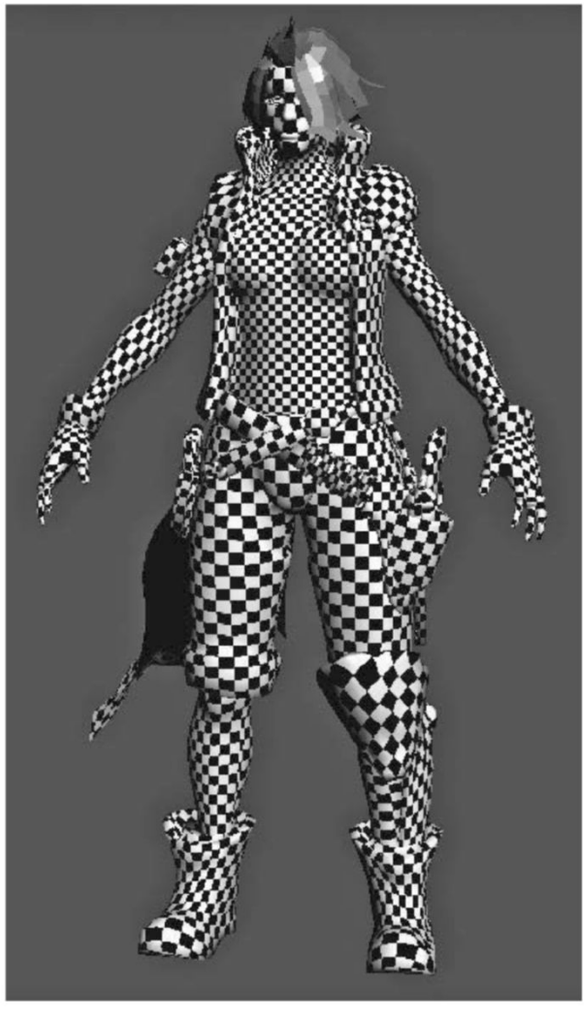


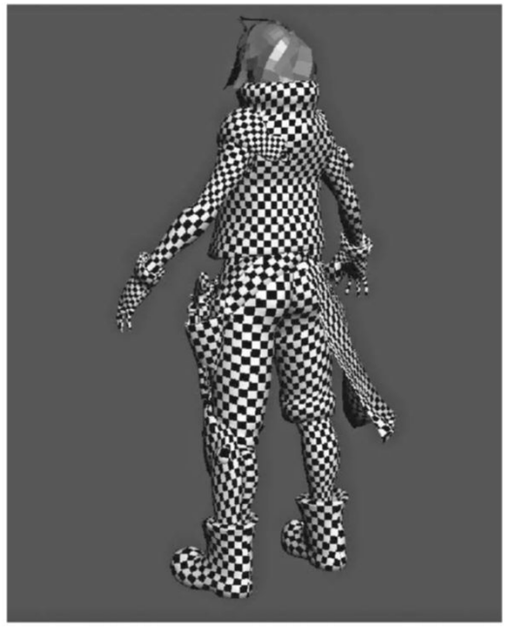
21 Overlapping geometry

Another thing to consider when creating a low-resolution model is overlapping geometry. With this character, there is a wide assortment of gear attached to her. Decisions need to be made if this gear will add to the silhouette, if modelling it into the character itself will create an unclean mesh and how the gear will be weighted to the character's skeleton rig. As you can see, we kept smaller details such as buttons baked into the character as they didn't add any change to the character's silhouette to make it 'look' more interesting. We also left the belts and guns as floating geometry so that they could slide over the body if need be (and so there is also the option to animate separately in the future).

Initial texturing

Unwrapping the model and texture painting





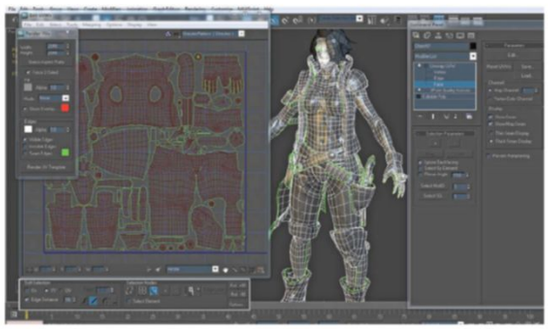
22 Unwrap the game character

The most important part of unwrapping a character for games is to avoid stretching in the UVs. This can be prevented by creating a chequerboard material, increasing the number of 'squares' (making sure that both the horizontal and vertical numbers are the same if you're using a square texture) and applying it to the model you'll be unwrapping. Maintaining the same density is also important, but it is common to give some important focal areas more room for detail than others. For example, UV space for the soles of shoes can be sacrificed if it means the face will have more room for texture detail.

16 hours model time
Resolution: 3,508 x 2,717

23 UV maps and padding

Another thing to keep in mind when unwrapping your character is to leave enough 'padding' between your UV islands so that when the textures 'mip' down, texture portions on one UV island won't bleed into another. When textures 'mip', they essentially shrink so as not to fully load a texture on screen. When this happens, texture detail blurs and if there aren't enough pixels between UV islands, textures can merge with other areas. This is also a reason why black seams show up when characters are far away from the camera, as the textures are blending with the black background of a texture map. At this stage we export a UV map that we will use as a guide in Photoshop to indicate where different elements begin and end.

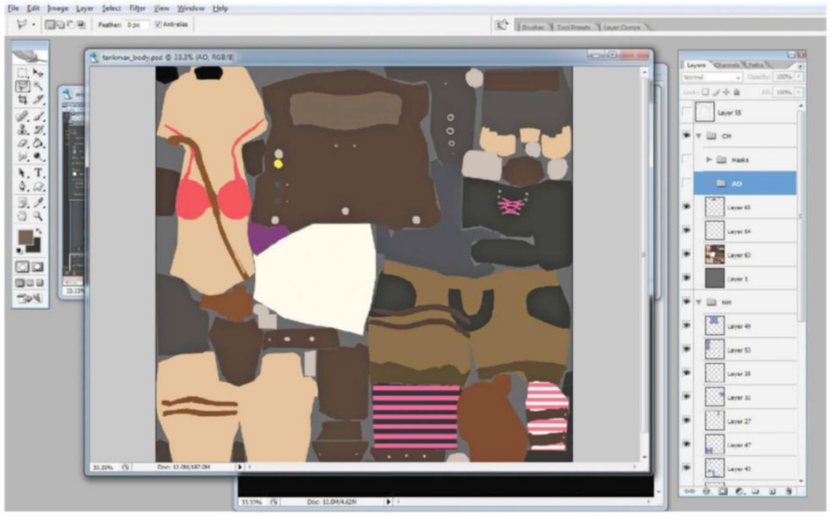


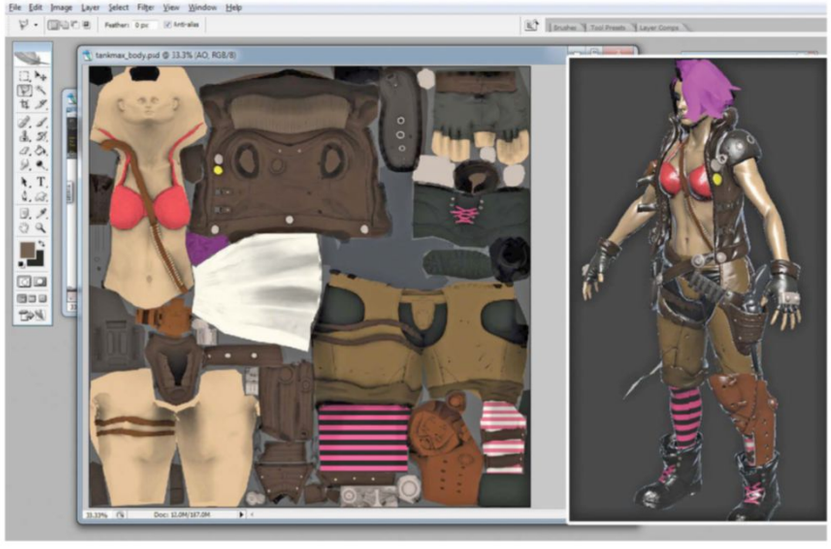
24 Bake Normal and AO maps

We are using the free but powerful program xNormal for all our baking needs. There is no mandatory viewport, so it's very light on your machine and baking a large map takes only seconds. We load up all of the high-poly models exported from ZBrush into the High Resolution tab and the low-resolution model (or chunks of the model if overlapping pieces will cause raycast errors) into the Low Resolution tab. From here you can simply set the distance xNormal will search for information from the surface of your low-res mesh, set the map types you wish to bake (there is a wide variety here, but we are sticking to Ambient Occlusion and Normal maps) and click Generate Maps. It's good to work in 'chunks', ie bake the head separately from the hands and the main torso and then compile them all together in Photoshop. Sometimes this isn't necessary if your character is one consecutive piece, but generally isolating objects helps for speed and makes for less errors.

25 Lay down base colours

The first step to take when it comes time to texture is laying down base colours. This means choosing an approximate colour that the object will be and simply blocking it in on the texture sheet. This helps to visualise how the final character will look, as you can see the different elements of the character model pop out. It also enables you to quickly select different regions.





26 Add lighting information

With the Ambient Occlusion map compiled, we create a set within the diffuse texture and set its blending mode to Multiply. Next, we drop the final Ambient Occlusion map into this set. This adds shading to the character and really helps to set off the various elements of the model, as well as giving the otherwise plain base colours some depth.

Too much of a good thing...

Adding too much ambient occlusion into your texture can actually lower the quality of your final piece. The purpose of Normal maps is to fake lighting information and to create an illusion that the model is more detailed than it actually is. When the ambient occlusion in your texture, – or any lighting information at all for that matter – is too obvious it can ruin the effect the Normal map will have on your character. By having highlights and shadows permanently baked into your texture, shading information caused by the Normal map can cause a conflict – resulting in flat-looking textures or lighting errors. The key to this is balance – checking your work in various lighting situations to get the best results.

Another trick that has been used in the past that we wouldn't recommend is desaturating your Normal map and using it as a 'poor man's AO pass'. For the same reason, this method can lead to unwanted results – with too strong highlights and shadows baked into your diffuse texture.

It's best to have a minimal amount of lighting information in our textures to help details pop against one another. Though, this can be done by wearing down objects' edges or adding discolouration rather than via lighting that could be more easily delivered in game.

Artist Showcase

DR2_Psychos
Various applications (2010)
This is a sample of the art I produced for *Dead Rising 2* while working as a character and weapons artist for Blue Castle Games

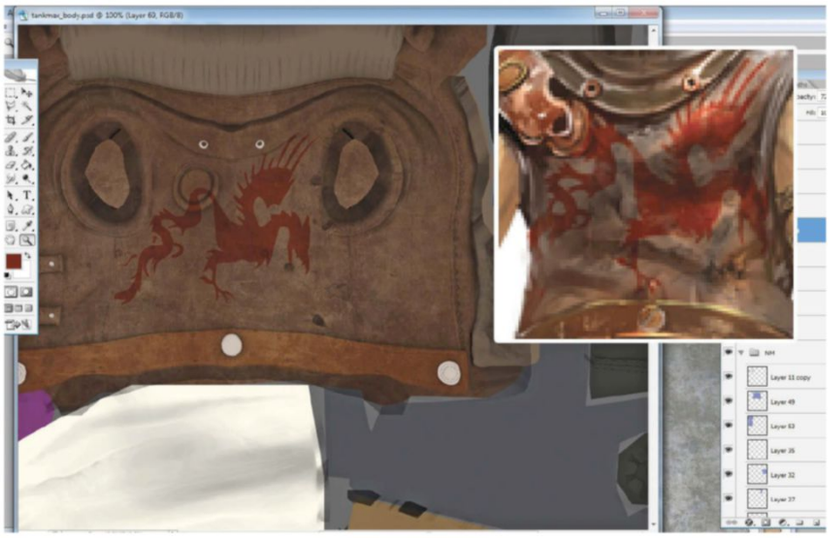
DR2_Psychos © Capcom Co, Ltd (2010). All rights reserved

The Bigs 2 – Paul Molitor Maya Beauty Render

The Bigs 2 – Mexico (Character Work)

Detail pass

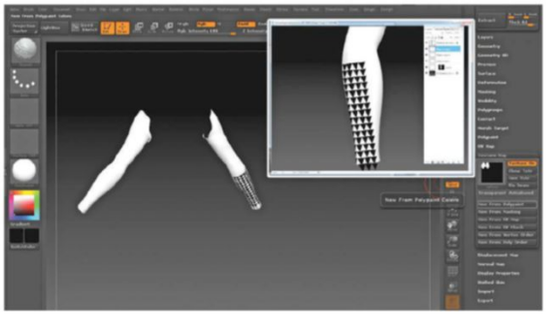
Refine the diffuse texture to make the surfaces more believable



27 Define materials

Kekai Kotaki did a great job at showing the material differences in his concept drawing (on pages 68-69). Our character has collected her gear from various places, so it is unlikely that even similar materials such as leather will be the same colour and even more unlikely that it will be the same quality. We also rely on photosourcing to help push the realism for the textures – being careful not to 'blanket' our texture with the same source file since it would look odd if all of the materials had the same fibres and were flowing in the same direction.

At this stage we also start to get into bolder surface details such as the logo on the back of the vest. For this, we simply used Kekai's concept as a guide and created our own single colour logo that would go across the back.

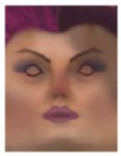


28 Use ZAppLink for tattoos

Though we are confident that our UV map is fairly even, adding details across seams can be tricky. We like to take the low-resolution model into ZBrush, subdivide it a few times and use ZAppLink to paint textures onto the model. From there, we export the newly created texture (which will be white plus whatever details were added) and use it as a guide in Photoshop. A good example of this are the tattoos on the Futuristic Femme's arms. Although a fairly simple pattern to make, they can be a nuisance to get right. We simply created the pattern, applied it to the ZAppLink arm, exported the texture through ZBrush and used this new texture as a mask, selecting the black areas and filling them with whatever colour and detail we needed. This way, any detail would conform to the low-resolution model and compensate for any seams and stretching that may have occurred.

Game engines vs real-time viewports

Game engines and 3D application viewports can give very different results based on their rendering systems. Once you have a character modelled and the texturing begins, we highly recommend exporting the character to a devoted game model viewer (Unreal, Marmoset, xNormal, Source, etc.) for the best results.

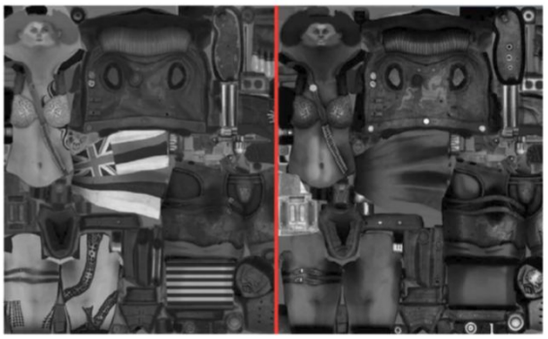


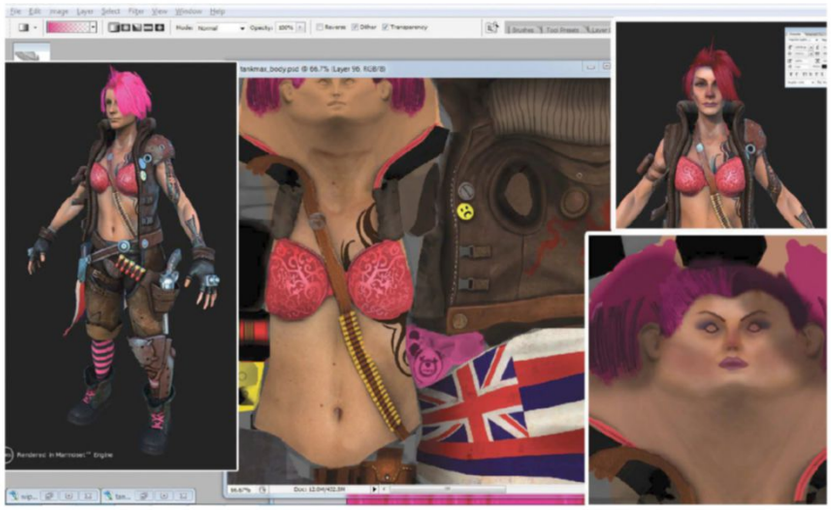
Finishing up

Create Specular maps and add final touches to the character's textures

29 Wear and tear

This character has been through many battles, so her gear has to reflect that. By using subtle grime overlays and dirt brushes, we add layers of rust and dirt that may have collected over time. We also like to add scratches and cracks on heavier materials such as leather that may have taken a beating over time. Again, with a combination of various photo references and hand painting, we try to achieve a level of grit that is believable but not distracting.

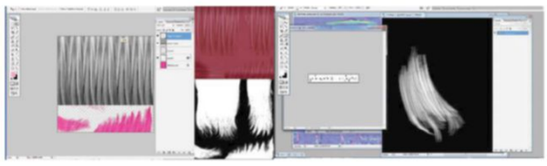




30 Create Specular maps

Specular maps should be created while you paint your diffuse texture, not after. The reason for this is that not all of the details in your diffuse texture will be reflected in the Specular map, eg stripes on a character's socks won't necessarily be present in the Specular map – instead it will be a flat colour resembling the sock's material, not the pattern. Many artists simply desaturate their diffuse texture but, as illustrated in the image above (desaturated diffuse texture on the left, manually created Specular map on the right), this simply doesn't work as not all diffuse details give specularity differences.

Various engines and viewport shaders also handle specularity in different ways. Some allow for specular colour via maps where as others simply use a channel of a texture and can have specular colour adjusted with a constant value. In this case, both 3ds Max and Marmoset (the model viewer we are using as a game engine equivalent) use a greyscale Specular map to which you can apply a colour of your choosing.

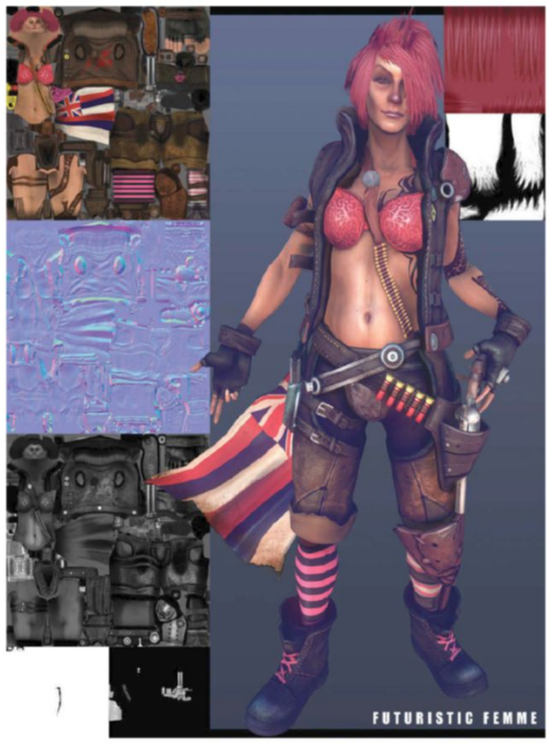


31 Create hair

The best and most common way to texture Alpha plane hair for game characters is to create islands on your texture map that will be reused by various chunks of the hair. In this case, we have created four major chunks: two that will act as the majority of strands on the head, one that will act as finer strands and one that will take care of the mohawk ridge.

We created a unique material for this and, much like the process used for the rest of the body, began laying down base colours for how the hair would look – using various tones of pink and purple. From there we overlaid hair photos to give subtle highlighting. The real trick is to create an Alpha mask that will tell the rendering engine which part of the texture is visible and which part isn't. This stage of the process will require a great deal of time as the Alpha mask needs to be painted by hand to avoid any odd 'chunks' of data you may get when creating a mask from a photo.

We paint our character's hair by creating a custom brush in Photoshop that is essentially a few different dots varying in size horizontally. We then adjust the brush properties to make the brush taper with each stroke and begin painting strands.



32 Game model viewer & tweaking

Once all of the details have been laid out on the texture, it's just a matter of tweaking and adjusting the final images under different scenarios until you reach a point where the character looks acceptable under different lighting situations. It is a well known fact in the game-art world that the longest time in character development is the last ten per cent, and you will quickly find out how true this is. The final adjustments to your textures can be minimal – a fleck of paint here, a scratch there – but they can really give life and history to your character which makes all the difference.

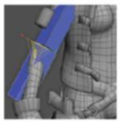
> "The final adjustments to your textures can be minimal – a fleck of paint here, a scratch there – but they can really give life and history to your character which makes all the difference"

Now that the Futuristic Femme is textured – as demonstrated over the previous few pages of the book – we can begin setting up a very basic rig to pose our character for presentation in an art portfolio. In this case, our purpose will be to set up a skeleton out of simple geometry that will be used to pose our character.

Various game engines handle bones in different ways and have their own idiosyncratic systems (actual geometry, custom skeletons like CAT, implicit objects, etc). But we won't be focusing too much on that here as it isn't strictly relevant.

Adding a pose brings a character to life, transforming it from the static pose used during the modelling stage. It can display your character in a more favourable way and enable the action of a scene to really shine through.

In this part of the tutorial, we'll use 3ds Max to create a basic, forward kinematic skeleton, weighting the character mesh to this skeleton and creating a pose that complements our feisty steampunk heroine.

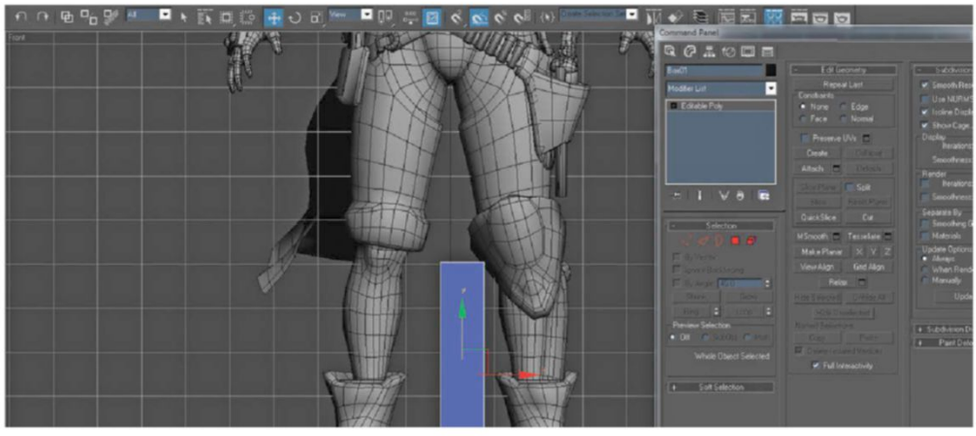


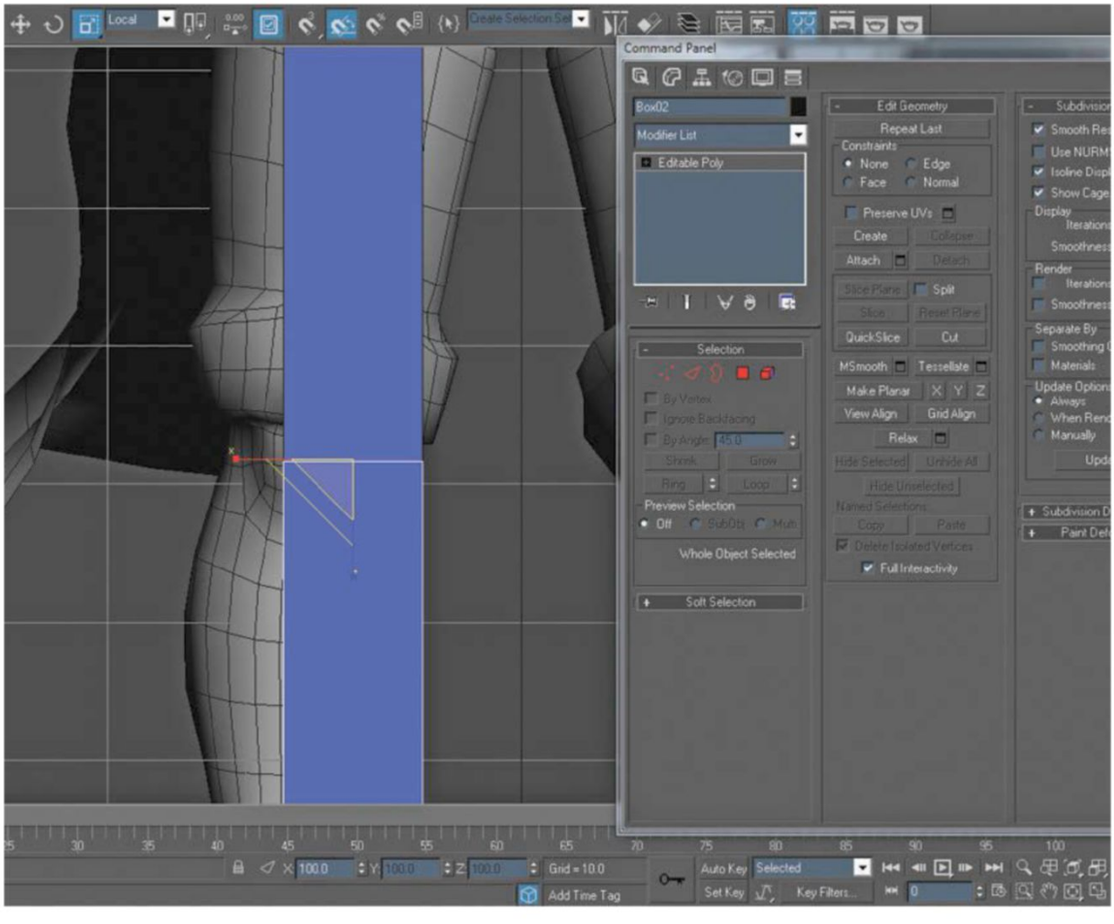
Begin your bones

From the legs up

33 Make a leg!

Let's begin creating the skeleton of our character at the legs. Creating objects in the Perspective view can lead to lots of tweaking, adjusting and generally wonky results. Alternatively, you will save yourself from a lot of headaches by working in Orthographic views such as the Front and Side viewports. Start by switching to the Front view and creating a box that spans from the kneecap to the ankle. You can adjust the thickness of this object either in the relevant parameters or via the Side views. Before moving on, be sure to convert this object to Editable Poly.



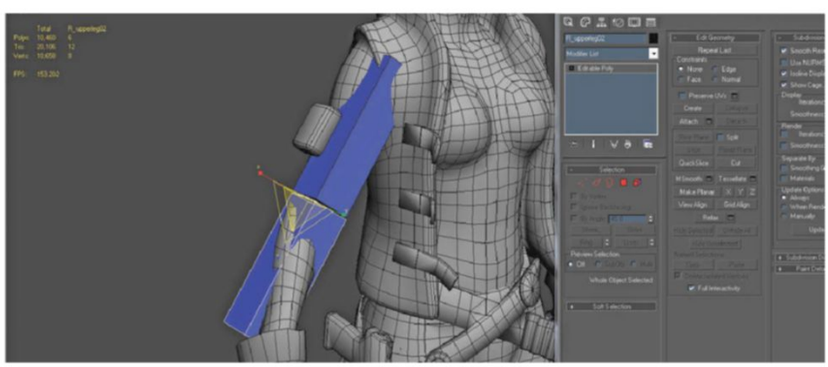


34 Continue with the leg

This object can now be duplicated and moved up the character's leg to create the femur (thigh) bone. Using the character model as a guide, make sure the two bones meet roughly at the centre of the knee joint. We can adjust the bones later to properly fit with the body. Generally speaking, all of these bones will just be rotated. In reality, no bones are actually translated or else they would pop out of their sockets! For example, you move your hand 'up' but it is really a series of twists and turns that make that happen. So, make sure that the pivots of your bones are located where the bones would actually rotate from. Those pivots can be tweaked by selecting the object and enabling the Affect Pivot Only button in the Hierarchy tab.

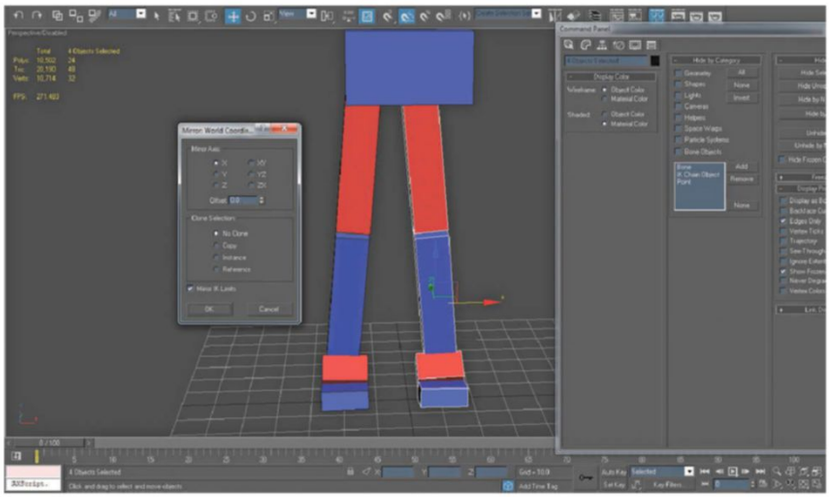
Software used in this piece

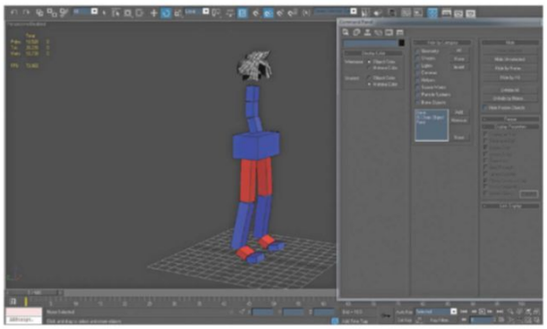
3ds Max ZBrush Photoshop



35 Up in arms

Once the leg is set up, grab both leg bones and duplicate them. Then, in the Front view, move these up to the arms and freely scale as needed to match the character mesh. Follow the same process used to create the Futuristic Femme's legs in the previous two steps to work up the arms, making sure that the major joints are in line. With skeletons as simple as this one, you can only approximate as you're creating a much simpler version of reality; the main concern is getting a character to 'look' believable at face value, even if the anatomy isn't perfect. Keeping joints fairly aligned will help with our deformations when it comes to the posing stage later on.





37 Feet, pelvis and spine

The feet, pelvis and spine are fairly simple to create and abide by the same rules we have been following up until now. The pelvis can be a simple object that will act as the centre of gravity and as the nexus of the entire rig.

The feet will consist of two bones that will act as the toes and ankle. The spine is an overly simplified version of its real-world counterpart, dividing the entire column into a few sections. We find that three spinal sections work fine for twisting and bending. Obviously, the more bones that you apply to your character's skeleton, the smoother the deformations will be, but in a game environment this difference can be unnoticeable. It can also be too expensive when it comes to polygons and the final bone count is always something to be kept in mind.

36 Mirror the limbs

Our character is fairly symmetrical. In a game skeleton situation, we would most likely create bones for the guns on her sides to allow animators the ability of secondary motions. In this case though, since we are just looking for an interesting static pose, the character's gear will just be weighted to the legs. Taking that into consideration, we can simply mirror our limb bones and place them where needed.

Keeping it clean

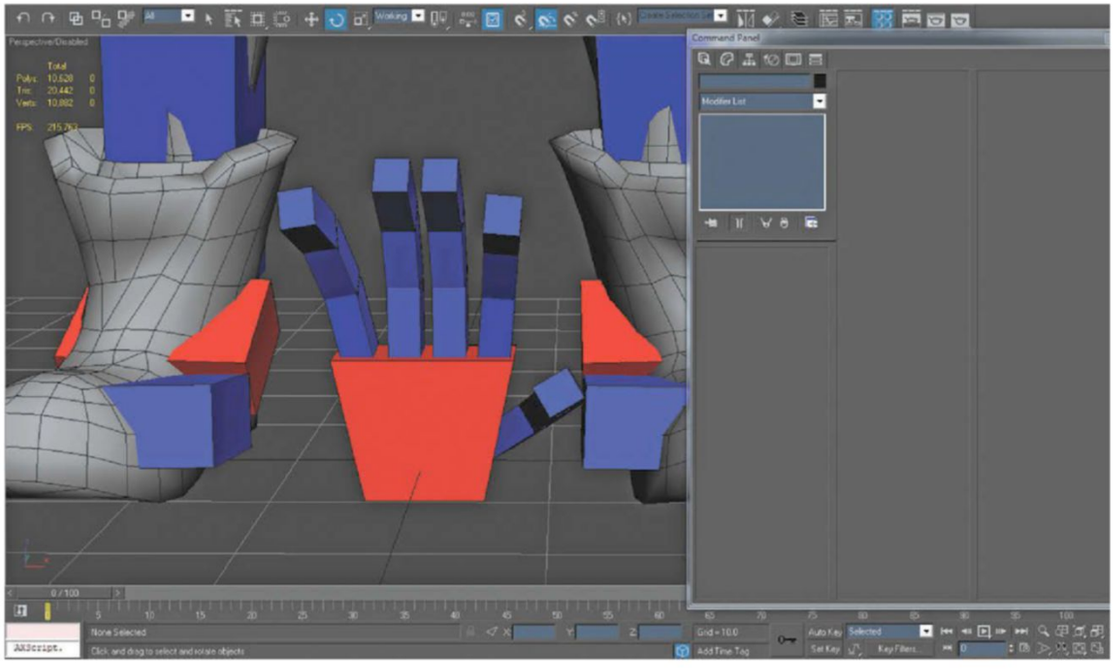
When it comes to game engines, sometimes things need to be done in a certain way. Models that have a history can lead to some 'interesting' results like flipped faces, rogue vertices and corrupt meshes. So, be sure to reset XForms on your models to avoid any hiccups in the process. In other applications you can also clear all history to be certain that the model is nice and fresh.

It is also beneficial to create a naming scheme for your skeleton early on. We tend to preface bone names with a 'side' indicator such as 'R_ upperleg' and 'L_ upperleg'. This makes life much easier when it comes to the time to set up bone linking and spot problem areas.

Some game exporters will also export the entire scene for skeletal meshes when using the default settings, so, if you do have layers with hidden geometry or older models in the scene left by mistake, be sure to delete them if they aren't needed in the game. Errors like this can send triangle counts through the roof (if, for example, you had a high-poly mesh in the scene for reference) and cause exporting errors (meshes with no textures, no weighting, duplicate names, etc).

Give yourself a hand

Getting down to the details with our rig

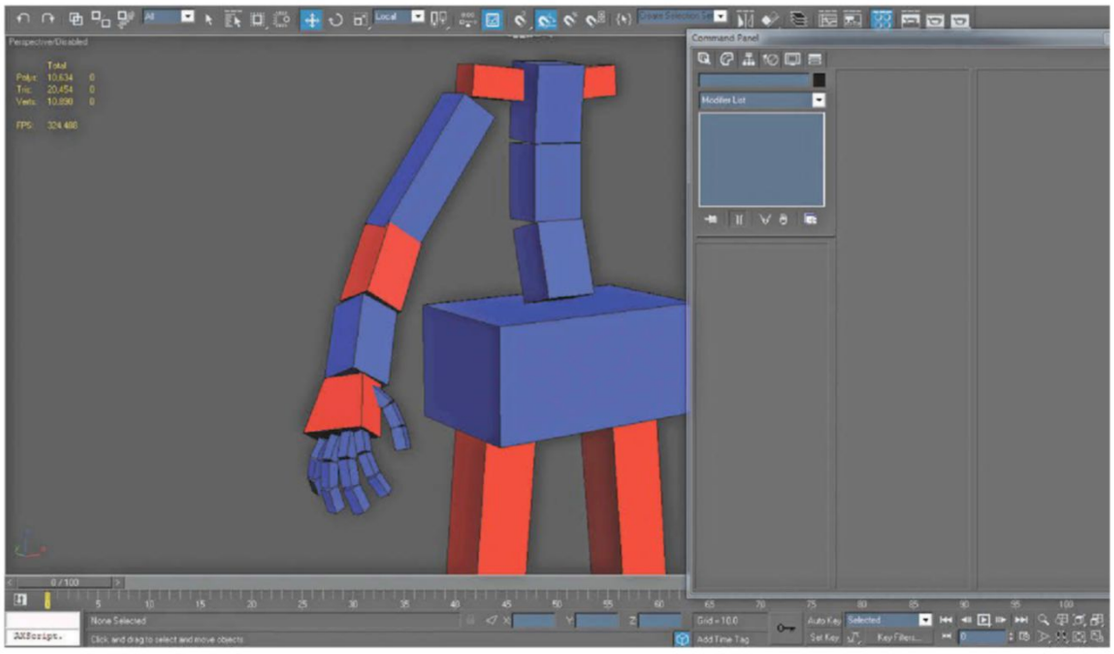


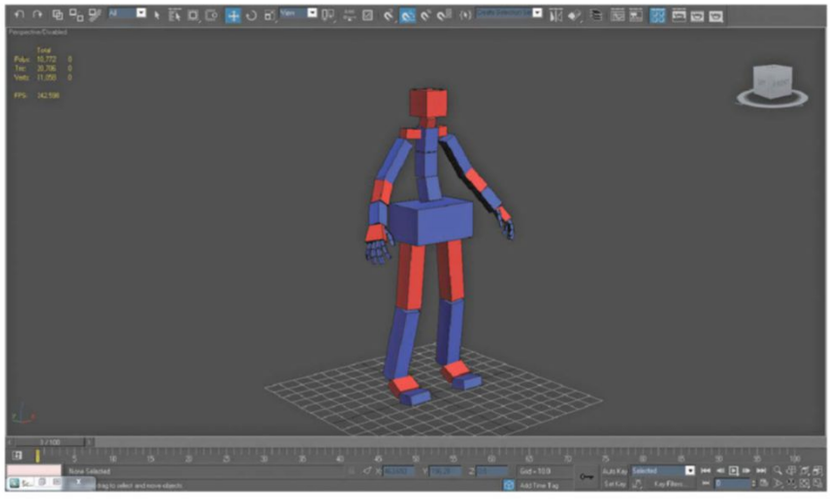
38 Handiwork

Much like modelling the human hand, many things can be done once and duplicated as needed, which can save you a lot of time. We begin by creating an object that will serve as the palm of the hand. This will be the base for our hand's weighting, which will prevent the fingers from affecting the entire hand. Then, following much the same workflow that we used on the limbs, we create a bone to serve as a finger bone and duplicate it two times to match up with all of the knuckles. Lastly we duplicate the entire set and move them as needed for each finger and thumb.

39 Twists, clavicle and placement of the Femme's hands

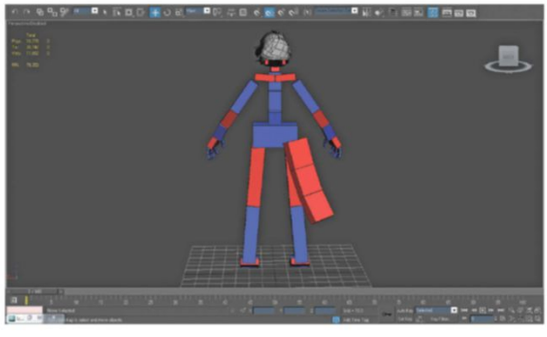
At this stage, we need to refine the arms. Add a second bone to the forearm; this will replicate how the forearm twists in real life and avoid sharp tears at the wrist and elbow when the hand moves. We also move the hand into place, using the model as a guide, and adjust the finger placement as necessary. Create a clavicle (collar) bone coming from the last spine element and spanning to the arm. This will give the chest and shoulder region shape during deformation and not rely so much on just the arm or torso bones.

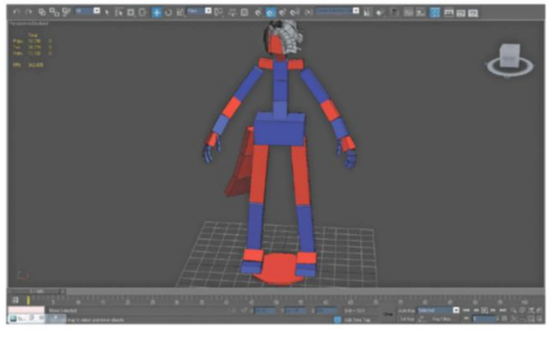




40 Get a-head

We keep the head and neck fairly simple. You can easily get into creating bones, just as we have been doing, for the purposes of facial animation and a 'poor man's' hair simulation. In this case, the head bone will suffice for the head and hair movement and benefit from the neck bone for blending into the body. In general, the neck doesn't move – the head will rotate in all directions with the neck acting as a base to prevent the head from looking 'floppy'.





41 Cloth bones

It's common in games to use bones as a cheap form of cloth simulation. Even though some games do utilise cloth physics, that information tends to be killed off when the character is at a far-away distance. So, to compensate for that, cloth bones can be used. Much like the spine, we simply create a string of objects for our character's flag that she has tucked into her belts. We can also benefit from using the pelvis bone as a base rather than having extra bones for the flag itself.

42 Create a base

Some game engines require the skeleton hierarchy to end on a 'dummy' bone which can also act as a base for animators – enabling them to reposition an entire character in one quick and easy move, without having to displace any other bones. In general all of our bones will feed through our pelvis – mostly for the sake of simplicity. You can, however, create a bone attached to the feet that is used specifically for the aforementioned purpose and never have any geometry weighted to it.

Control rigs

Game engines tend to take bone information as an analogue thing, using the bones' rotation rather than any complicated system that may have been in place in your 3D application. For example, helper objects that may have been created for bone selection or movement limitations will just be ignored. That being the case, in more complicated scenarios, there can be two rigs working at the same time: a rig that has more detail such as inverse kinematic setups or a bone setup controlled through a GUI and a more simplified character rig that will be used in game – much like what we have in this project. This way, animators can have many different tools and options to make their work easier and still keep the final rig simple and clean.

It's also possible to place bones in your rig that will actually have no effect on the character itself but can serve as locators as they'll still be recognised by the game. A good example of this would be a back-holster or locator for a sword sheath.

Artist showcase

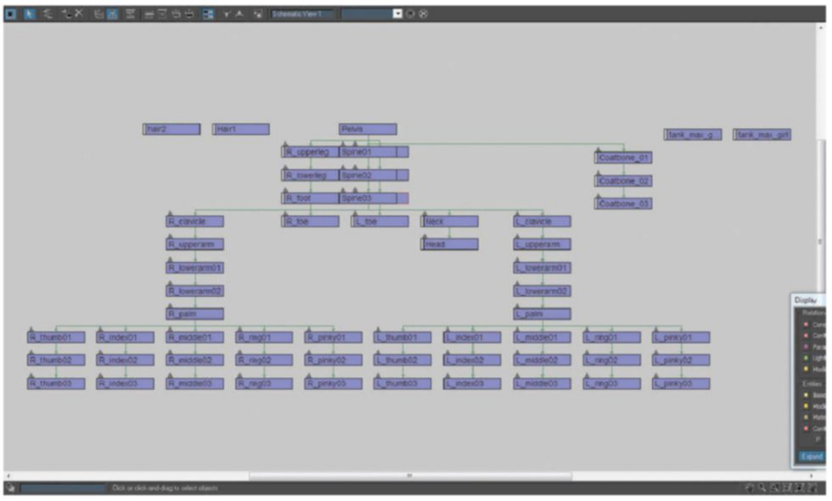
Bishop **3ds Max, ZBrush, Photoshop, Marmoset Engine (2008)**
This is a character created for the fourth Dominance War competition. A rough-around-the-edges cleric armed to the teeth with a magical gauntlet and a Gatling gun

The Bigs 2 – Grady Sizemore **Maya, ZBrush, Photoshop (2009)**
A beauty render created for the title *The Bigs 2* released by 2K Sports. The image was eventually used in loading screens throughout the game

The Bigs 2 – Fergie Jenkins **Maya, ZBrush, Photoshop (2009)**
One of the many 'retro' characters featured in *The Bigs 2*. This beauty render was also created for loading screens featured throughout the game

Skeletal hierarchy

The leg bone's connected to the…

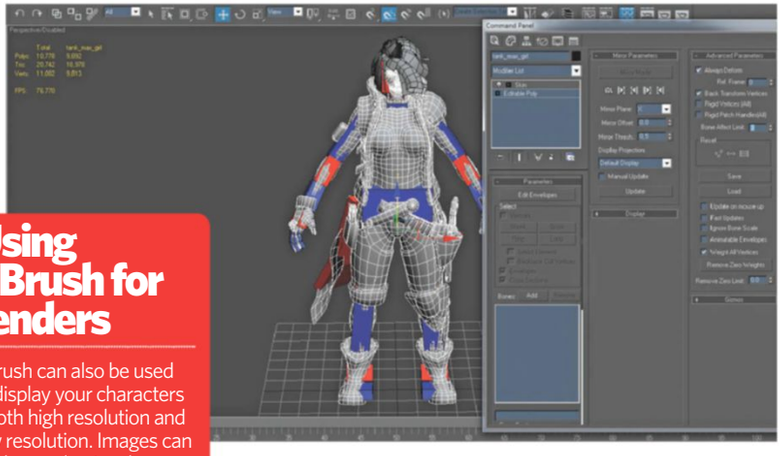


43 Use the Schematic view

The Schematic view lists all of the available objects in the scene, including bones. We will use this to connect all of our bones into a system by utilising the Link feature and selecting 'children' and 'parent' bones – basically, this is where you have one bone relying on another, eg the upper leg is parent to the lower leg, which is parent to the foot, etc. We start from the outside and work in. The tips of the fingers connect to one another, then to the palm, up the arm, through the spine and to the pelvis – where it stops (unless you choose to add an additional 'base' bone). This way, for example, if we rotate the palm, the fingers will move as well, but still also be able to rotate freely on their own.

Weighting & posing

Getting her ready for action…



Using ZBrush for renders

ZBrush can also be used to display your characters – both high resolution and low resolution. Images can be dropped onto a large canvas and utilise the ZAppLink feature to export an image or higher-quality images can be created using the Render feature, which will enable more complex shading. Combining multiple passes in a post-processing application such as Photoshop can produce great results.

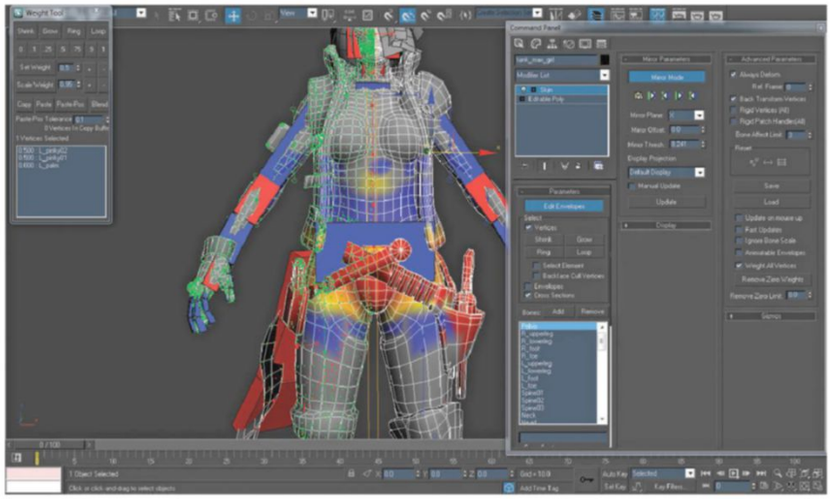
44 The Skin modifier

In 3ds Max, we use the Skin modifier to bind our character to the skeleton. Once the modifier is applied, set the Bone Affect Limit to 3 and add all of the bones that will drive the character into the Bones panel. Controlling objects, say if we had inverse kinematic controllers, would not be included in this list. Even though they would be controlling the bones, the character mesh will not be weighted to them. We also use three bones as a maximum to avoid any overly small weighting values, because problems can occur on game systems when one vertex is affected by a lot of different bones.

45 Painting weights

Weighting the character mesh to a skeleton is a fairly simple, if tedious process. Basically, you will go through each vertex, or edge loop if possible, and weight it accordingly to a bone, avoiding rigid weighting unless the object wouldn't deform and blending weights into adjacent bones. You assign weights by enabling Vertices under Edit Envelopes, selecting the actual vertices on the model and then the applicable bone in the Bones tab. With the Weight tool open, assign the influence that particular bone will have over the mesh.

The automated weights created at first will most likely be messy; we tend to weight everything to the pelvis at first and then work out from there. For example, selecting a few edge loops in between the first spine and pelvis, selecting the first spine bone in the Bones tab and then setting the Weight to 0.5 in the Weight tool. Continue with this process throughout.



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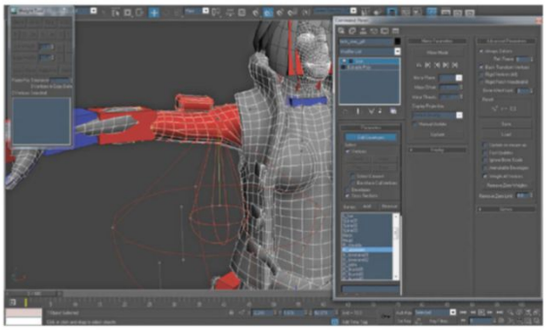


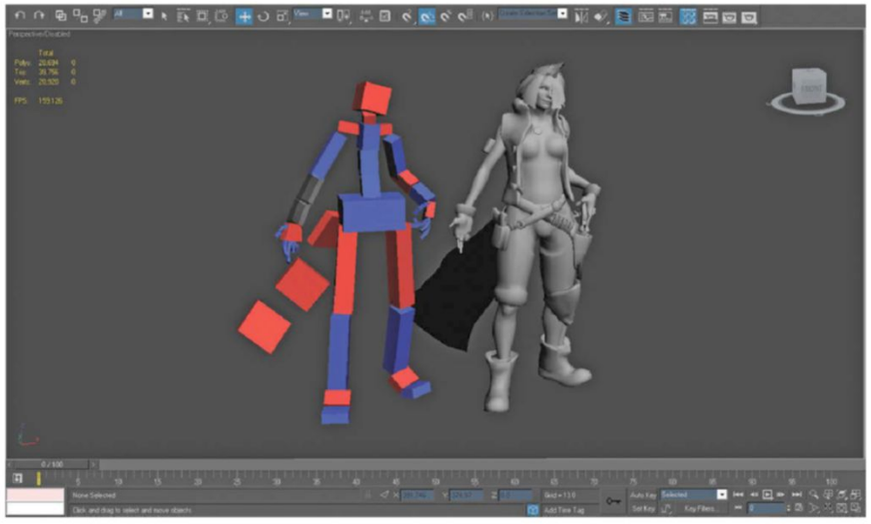
46 Test poses and animation layers

It can be difficult to tell if your weighting is solid or not. A way to test this is to create a new animation layer and freely rotate the bones around. To create an animation layer, go to the Motion panel, create a new additive layer, press Play and make sure that the new layer is selected. Now the bones can be moved as needed and this animation can be turned off – or ignored – when the time comes to set up an actual pose or export. This is also a nice trick to keep a bank of poses to switch through quickly.

47 Strike the final pose

There's no real trick to selecting a pose for your character. It just takes a lot of trial and error. Try to select a pose that will display the majority of the character in a favourable way and a camera angle that doesn't distort heavily or focus on 'rough' areas. Try selecting a pose that sells the character's personality – remember, many things will be lost in translation as your average viewer has no backstory or frame of reference. For example, a comedic pose can simply end up looking goofy and 'wrong'.

> Try to select a pose that will display the majority of the character in a favourable way and a camera angle that doesn't focus on 'rough' areas

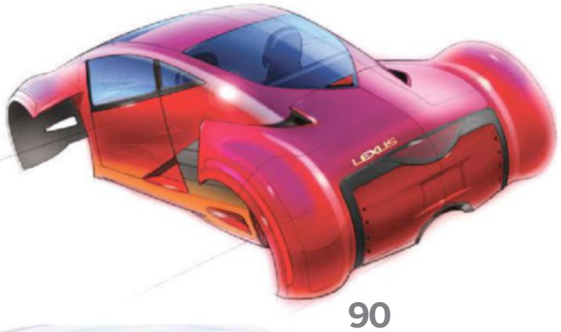


48 Game model viewer and presentation

We will use the Marmoset Toolbag as a quick model viewer due to its ease of use and focus on creating images for artistic presentation – rather than full integration into a game engine. Many different features are available for post-processing effects and exporting a print-ready image is as simple as pressing a single button. It also accepts OBJ files and many different image formats without the need for complex shader setup.

16 hours model time
Resolution: 3,508 x 2,717

Vehicle



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Inject some movement into your 3D projects, whether on land or in the air

90 The future in motion
Harald Belker shares his experiences

96 Design a muscle car
Create your own vehicle assets

102 Texture and render a muscle car
Apply materials to your muscle car

108 I made this...
AC Cobra

110 Scorpion spacecraft concept design
A 2D space-exploration vehicle takes shape

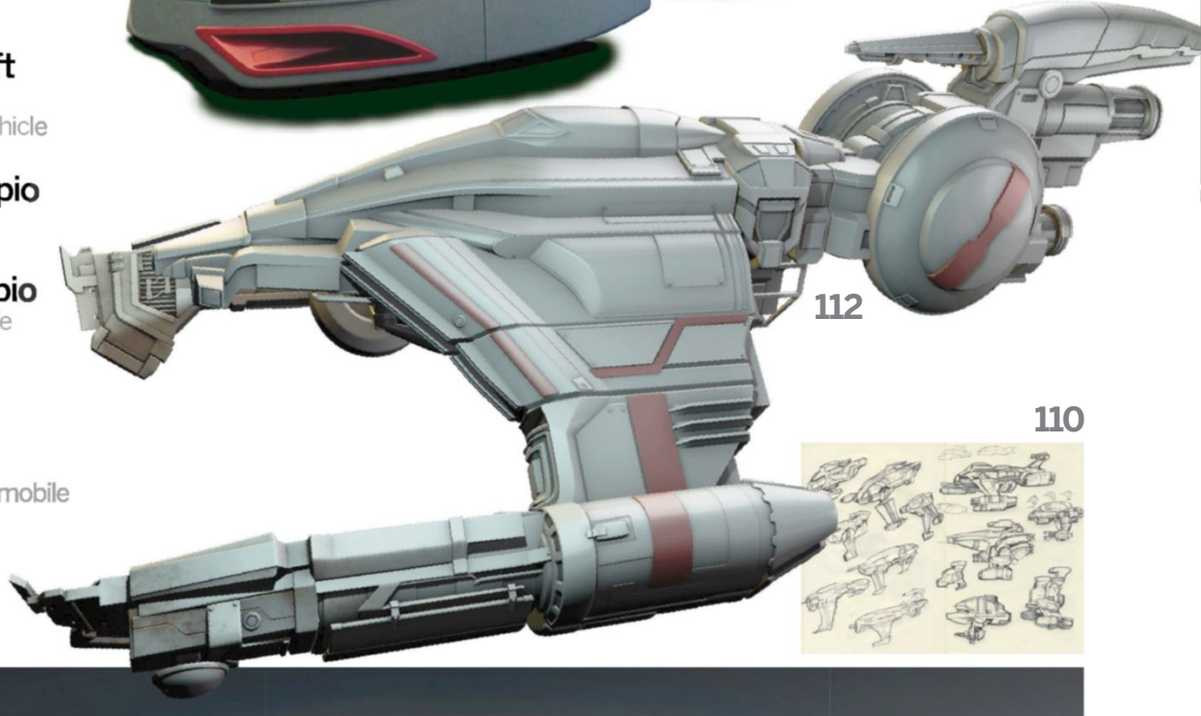
112 Modelling the Scorpio
Tackle your spaceship's complex shapes

118 Texturing the Scorpio
Bring your spaceship to life with realistic textures

124 I made this...
Automotive design

126 Model a hot rod
Piece together a cool automobile

132 Texture and light a hot rod
Use LightWave 3D to add more depth



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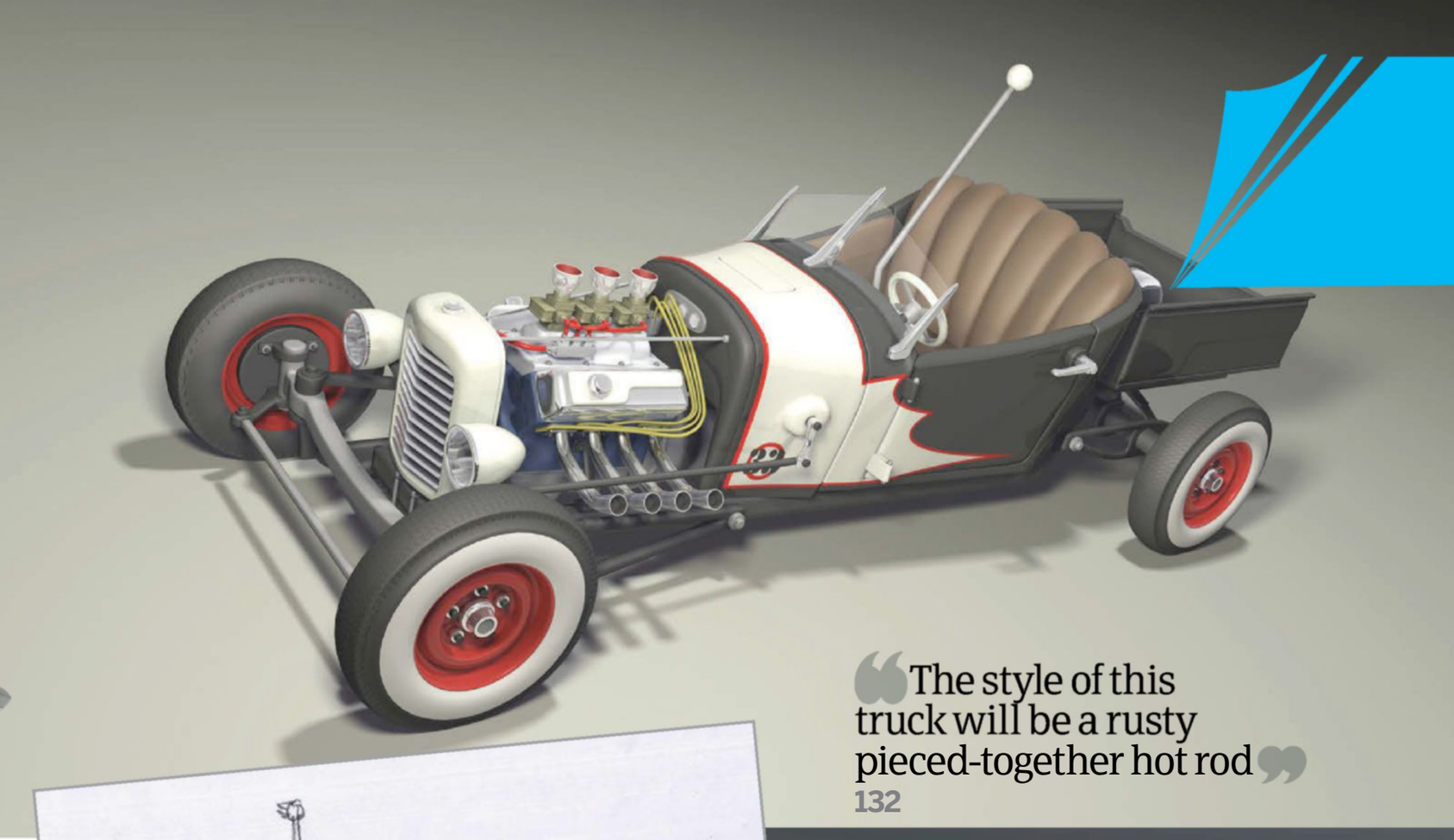
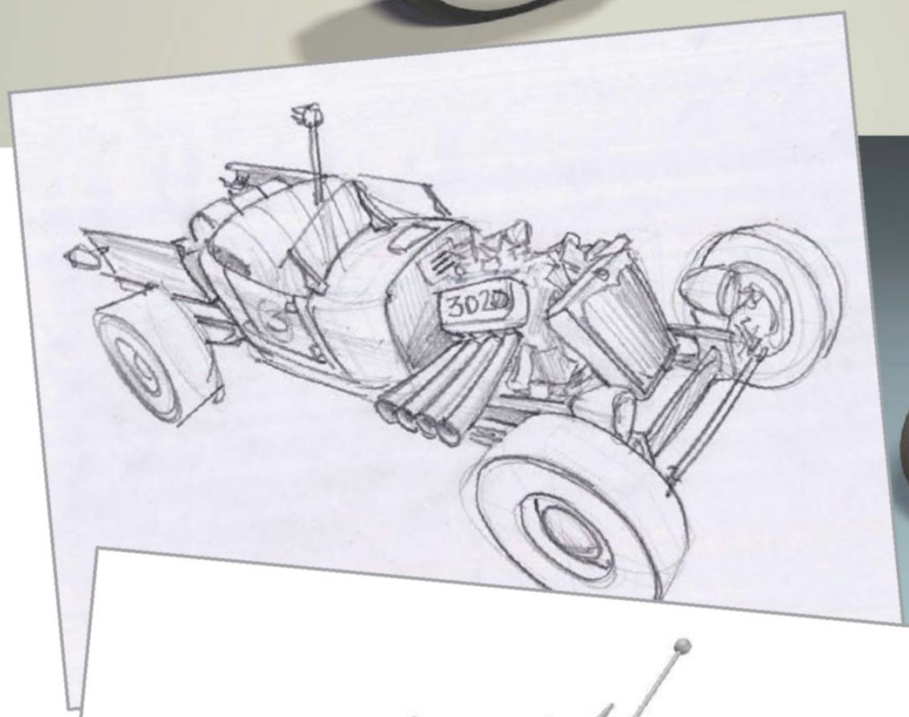
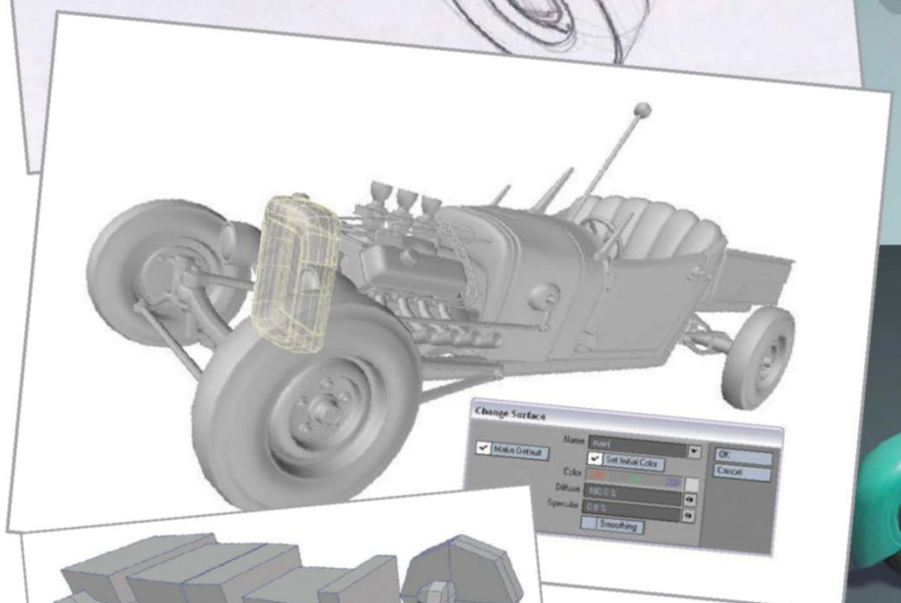
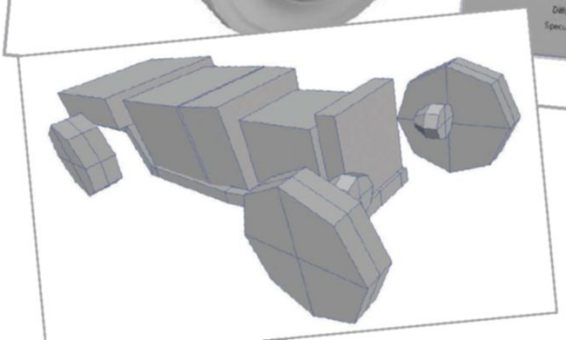


> “The style of this truck will be a rusty pieced-together hot rod”
> 132

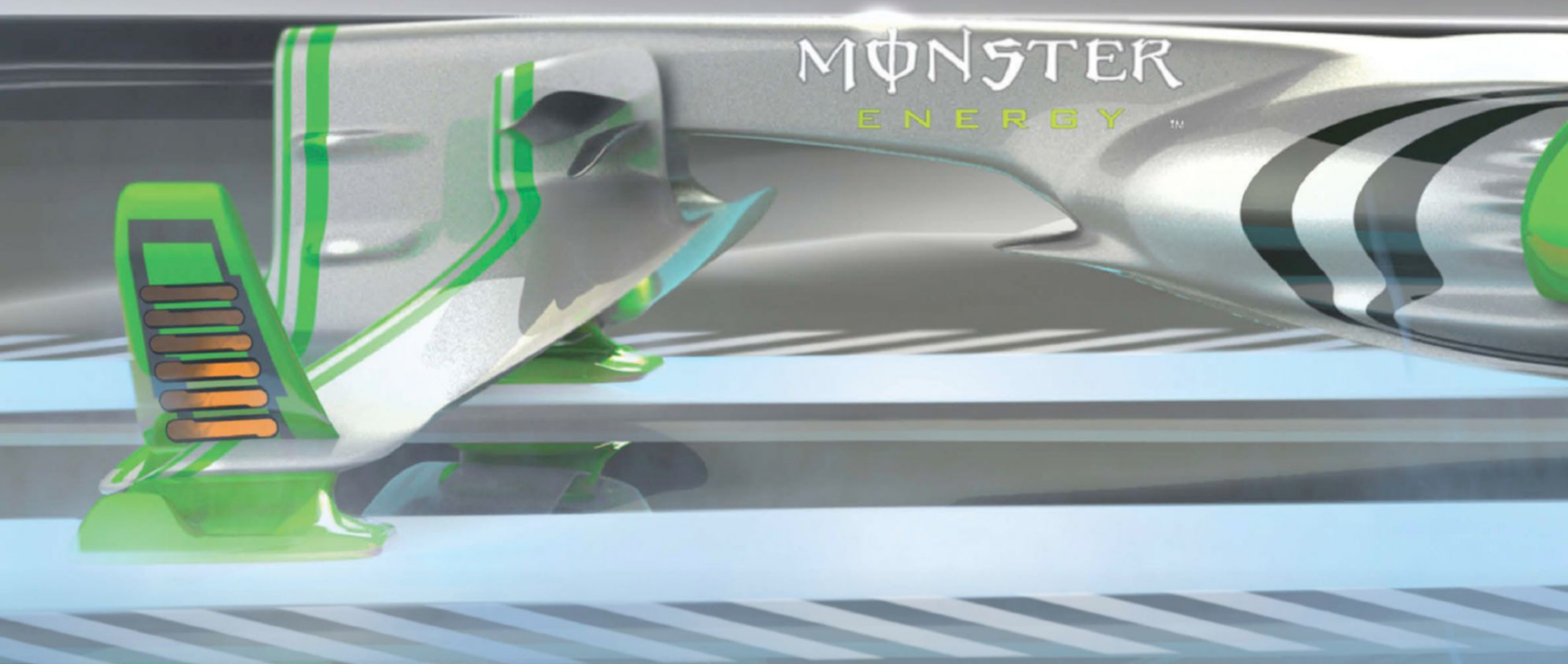






THE FUTURE IN MOTION

German designer Harald Belker originally came to the USA on a tennis scholarship, before finding his way into automobile design and, later, the entertainment industry. Now, he's teamed up with Design Studio Press to release PULSE, the story of racing in the future. Samuel Roberts speaks to the concept designer about taking risks on the professional road...



Many people are fortunate enough to know what it is they want to do in life right away, as they work towards a specific goal or dream from a young age and structure their entire lives around it. For German-born concept designer Harald Belker, his career has taken two radical shifts that his younger self couldn't possibly have anticipated: first, from sportsman to artist, then another, from automotive designer to a Hollywood concept designer, an inimitable path that has led him to working on some of the biggest movies in the entertainment industry.

"I was more into sports than anything else – tennis being my main sport," he tells us, stating that design was never a priority in his youth. "I got a tennis scholarship to the US and studied engineering first, and only after graduating [did I realise] I'd have to focus on what I was going to do for the rest of my life." Despite training for five hours a day for much of his life, Belker fell out of love with tennis, and at the age of 24, it became apparent he wouldn't make a living from the sport. Belker enrolled at the Art Center College of Design at Pasadena, California. "I heard about automotive design, and kind of chose the Art Center partially because I was on the west coast of California. Plus the US has the Royal College of Art. I got accepted, went through the school... before I really focused on automotive design – I never really knew about automotive design." Despite this, the high-concept work of Luigi Colani was an early source of inspiration.

After spending so much of his life focusing on something else, Belker was suddenly faced with a legion of artists who had invested years in honing their craft. He worked relentlessly to catch up, with his athletic discipline helping in this regard. "I do

> "The dilemma is, you spend many, many years of your life trying to do one thing and then kind of late you decide it's not for you. But I got lucky"

Name
Harald Belker
Website
www.haraldbelker.com
Country USA
Expertise
Automotive design
Tools of the trade
KeyShot, modo
SketchUp, Photoshop
Client list
Universal, Marvel, Walt Disney, FOX, Constantine Studios, Paramount Pictures, Sony Pictures, Revolution Studios, Warner Bros, DreamWorks, Icon, MGM, United Artists, Touchstone Pictures

All images © Harald Belker

Even the corporate sponsorship that plays a large role in current Formula One racing has carried on into the future in *PULSE*

remember the first day I got to the Art Center and kind of being faced with the fact that I didn't know how I got there. I had no previous education in drawing or design, so it hits you very hard, very quickly, but I was determined to make it work and I knew I had to work very, very hard at it."

The Art Center worked out, and Belker soon found himself working for Porsche and, later, helping to craft the Smart Car for Mercedes-Benz. Despite this significant success, his career direction wasn't quite satisfying him. "Once I was working in automotive design, I quickly got the feeling that it wasn't quite for me because it was very corporate. But the dilemma is, you spend many, many years of your life trying to do one thing and then kind of late you decide it's not for you. But I got lucky."

Belker's transition into the entertainment industry, like his switch from a sporting career path to joining the Art Center, couldn't have been planned. It was all born from a chance meeting. "I had already left Mercedes, because, really, I was at a satellite studio. And the thing about a satellite studio is, it's a perfect place to work but it really doesn't give you career options. I didn't want to get into management, I really wanted to be a designer, so I had quit and just did little jobs here and there to make money to live. Just

A

B

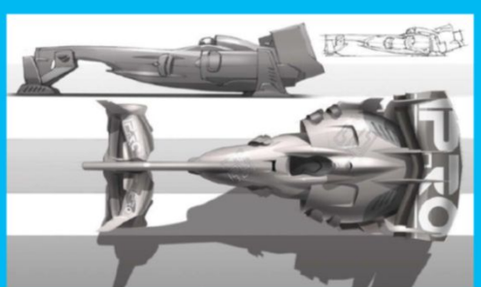
by the chance of running into a friend I went to school with, who already was working in the entertainment industry, he then called me back, two weeks later, [and told me] that there was an open spot on this movie [*Batman & Robin*] to design the next Batmobile. And, you know, that shit just doesn't happen! He'd already made a phone call for me to go and talk to the production designer. That spot was only available because the guy who did it previously was working on a different movie. The gravity of the chances that that would happen was huge. The production designer accepted me, she gave me a chance and everything else sort of fell into place."

The *Batman* job had an impact on Belker that would be hard to replicate. "It was a fantastic industry to get into. If I would have dreamt of doing anything, it would have been to work on the Batmobile. I mean, it took a few weeks to sink in that I was doing it, but the experience was unbelievably awesome. In hindsight, the film *Batman & Robin* wasn't all that good, but the experience was really, really great... Every movie afterwards never quite measured up to it, except for maybe *Minority Report* which we worked on for about a year and a half. Usually with movies, they tell you 'we're already two months behind'. It's usually a rush to the finish line on any movie project."

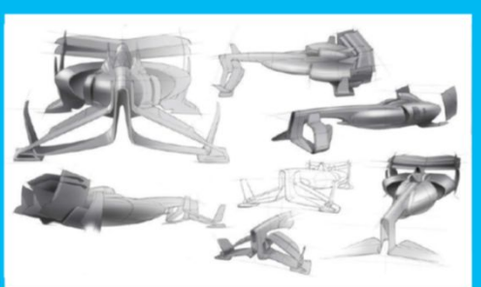
Since *Batman & Robin* was released in 1997, Belker has worked on a host of huge Hollywood titles, from *Armageddon* to the aforementioned *Minority Report* to the

SMART CARS

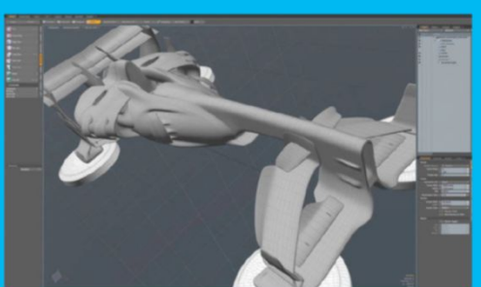
Belker explains how he takes a design from start to finish



01 The design process starts with sketches that allow me to develop an idea quickly. When I have picked a direction I will do a couple of quick renderings to help me further develop the main shapes.



02 Once I have a general direction, I still need to see how certain features could work. The more time I spend at this level, the easier it will be to model in 3D. Exploration of the details should happen here.



03 My preferred program is modo. It's a great app to see your design develop step by step. Depending on the time I have, I will detail it to a point that makes sense to me. It will not be a model to go to tooling with.

Spider-Man series, and has designed concepts for next year's high-profile remake of *Total Recall* and board game adaptation *Battleship*. Ever since the Batmobile gig, his automotive background has consistently landed him jobs in designing vehicles, albeit with a fantastical edge. The designer reveals how his experience of real-life vehicular design informs his imagined work. "Well, with fictional vehicles, there are no limits, so depending on the movie you're working on, it can be exactly the way you fantasise making it," he explains. "So, if I'm working on a movie, I'll get a blank piece of paper where I can say, 'I want this to have six wheels, just because it would look cool and it's cool for the scene.' And, we'll get to engineer and design it, so you have control of the complete package, and that, in a way, is truly innovative, but at the same time [the vehicles are governed] by the story."

It was only a few years ago that Belker stopped drawing everything by hand and started modelling his designs using modo. We ask him what provoked the transition. "Well, the competition," he laughs. "It doesn't mean that I've completely stopped – I still sketch out the very early stages, it's just that now I don't set up elaborate line drawings to show off the design. I skip that, and then go right into 3D modelling where I, as a designer, have control of what that model looks like. I don't have to do a whole set of drawings again to then hand them over to a 3D modeller, and he has to model it... which is a much slower process. My 3D modelling skills are still not where [those of] a professional 3D modeller are at, but it makes [the process] much quicker and easier."

Belker believes modo is universally friendly to any type of artist, thanks to the simplicity of its interface. "I think modo is one of those programs that makes it easy to jump into 3D modelling. Before, if you weren't an Alias modeller from the get-go, with the constant upgrades... I mean, you had to really focus on it. I pick up modo and SketchUp to help me with the design process, and I think modo is one of those programs that is intuitive."

When it comes to rendering though, he praises the sheer speed of KeyShot, even though he acknowledges the strength of modo's multiple capabilities. "modo has a fantastic rendering engine," he explains. "It's

- **A** *PULSE* was created between movie projects, and demonstrated Belker's growing interest in storytelling following his work on *Minority Report*
- **B** Belker hopes that *PULSE* will become a brand unto itself, potentially spinning off into a multimedia-based property
- **C** Belker's background in real-life car design has helped craft his version of the future into being
- **D** Here's a very cool look at one of Belker's beautiful vehicles in the upcoming earth-bound 2012 remake of *Total Recall*. There's a flavour of *Blade Runner*'s Spinner car meeting real life...

SPEED RACERS

Belker discusses his new book, PULSE: The Complete Guide to Future Racing

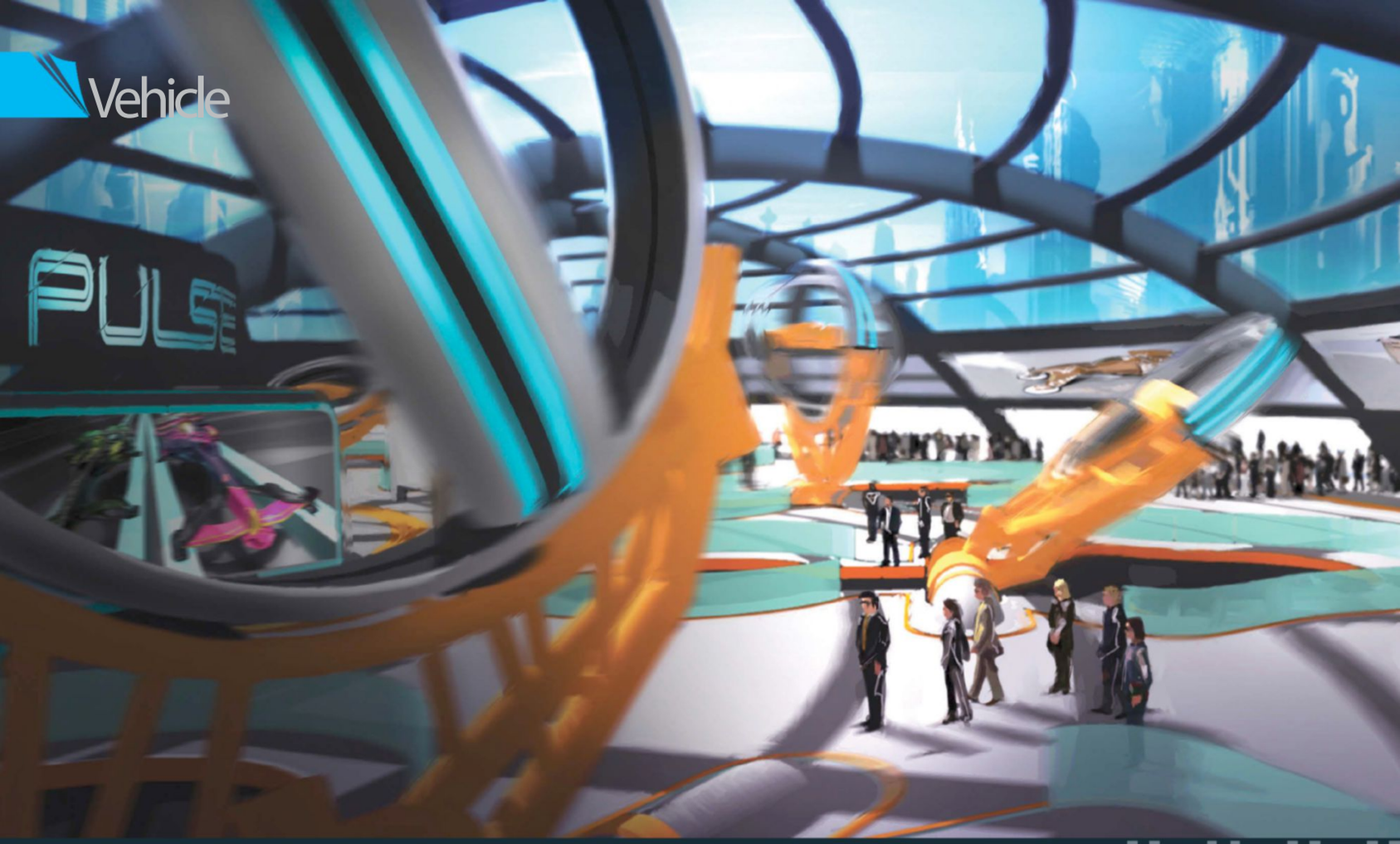
Following *Minority Report*'s release, Belker was invited to a lot of discussions about envisioning the future. "I found out many futurists have one opinion," he begins, "and if you don't share that opinion, they consider you an idiot... It definitely started the fire for me to create something that had these elements to really look beyond what's possible and exciting today, and then work it out in a way that is possible but fantastic at the same time."

The book breaks down the status quo of this future, including characters, settings and the politics behind the races. It even features a treatment for a possible film adaptation, along with storyboards. "First of all, I'm proud to have finished the book in a year and a half, next to working," he says. "Doing this stuff all day long, then going home and doing it in the evening and at weekends – well, it's tough. But, you know, if you want something that's truly yours, I guess you [find] energy reserves that you normally don't tap into. I'm quite happy with the way everything came together. One of the reasons why I did it was, when I would tell somebody about anything, basically, you would tell them one thing and they'd hear another, especially if you're dealing with something supposedly in the future. People, in general, have a hard time understanding what it is you're talking about, or they make up their own scenario in their head while you're talking to them. So, that's why I combined all that and brought it out in the book." *PULSE: The Complete Guide to Future Racing* is available from **www.designstudiopress.com** starting at US$40.

04 When the 3D model is done I can use it to set up renderings in modo, or use KeyShot. Applying graphics is much simpler in KeyShot, but modo can offer truly lifelike images – if you've got the time!

05 Here's a sample of my typical way of working with 3D. I am most interested in a dynamic perspective and good lighting. Colours and depth of field are two things that can be corrected easily in Photoshop.

06 For the final touchups, I usually add details and graphics that help me to compose a complete image. This step will make all the difference to regular 3D renderings; here I can insert my personal touch.

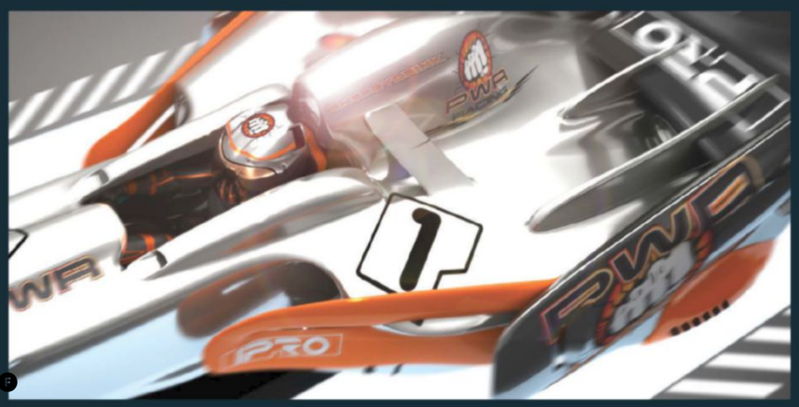


just that it would take another month to learn all the tricks and intricacies of that. Usually, we're asked to produce things relatively quickly, and an application like KeyShot is just unbelievably quick and simple and straightforward at kicking out beautiful renderings at a short notice and without a big hour-long setup. So, for the movie stuff, you're always under a gun, so to speak, so you get the 3D model just done and then there's a presentation, where you have to quickly render a few views. It's helpful in the way that the final product and quality is just so high with the programs that don't cost tens of thousands of dollars, that it's pretty fantastic and fun to watch what they render."

Belker is of a generation of designers that learnt to do everything by hand, having to make the transition to digital down the line. Despite the accessibility of modo and KeyShot, the artist believes there are certain advantages to having that background in traditional art, especially when it comes to iterating designs. "Well, I was one of the last to learn things in analogue – pencil sketches, watercolours, markers – that's how we learnt to show off the design. And I think it doesn't help with modelling, but if you're designing something, it helps if you have the ability to sketch things out. There's a brainstorming stage, and if you don't go through that, and you jump right in with the 3D modelling, you'll never come up with the great idea – well, I shouldn't say never, because everybody gets lucky – but in general, you have to go through a sketch phase and a brainstorming phase. Once you start modelling, you're sort of locked in, then you spend hours modelling, and you're kind of reluctant to change things because it's just not that simple. Once you have a clear sense of what you want to do by having sketched it out before, it will help the overall process."

For anyone who wants to concept vehicles, the designer has a few tips, depending on the type of artist you are. "Let's start with people who want to go to school. The emphasis on 3D models and finished vehicles is all a little early – I think at schools, that's what you're going to learn. So my tip would be, just focus on originality, do sketches of whatever you feel comfortable with and show that you are a creative thinker. For professionals out of school and looking for work – again, look online and look at people who do what it is you want to do and see what the level of competence and quality is. Again, it's all out there to see for people who want to work in automotive design; there are so many sites that deal with it, and that's what they have to [study to see if they] measure up. It's a very small industry – automotive and entertainment design – it's not like there are thousands of spots open so it's a very competitive [field]." Belker also mentions the emerging possibilities presented by mediums like videogames, though, and that all artists should make the most of the opportunity to showcase their work online – this possibility makes it much easier to break into entertainment than it was when he first entered the industry.

The future in motion



Belker's new book – *PULSE: The Complete Guide to Future Racing* – was produced as a passion project on evenings and weekends between gigs, and is being released through Design Studio Press. Belker and Scott Robertson are old college buddies, but it wasn't just that reasoning that sparked the collaboration. "Scott started his company – we did two books together, *Design Concepts*, with a group of artists, which were kind of his first books. His business grew from there. It was a natural choice to approach him, plus he makes it very easy – not just because we're friends, but generally doing a book."

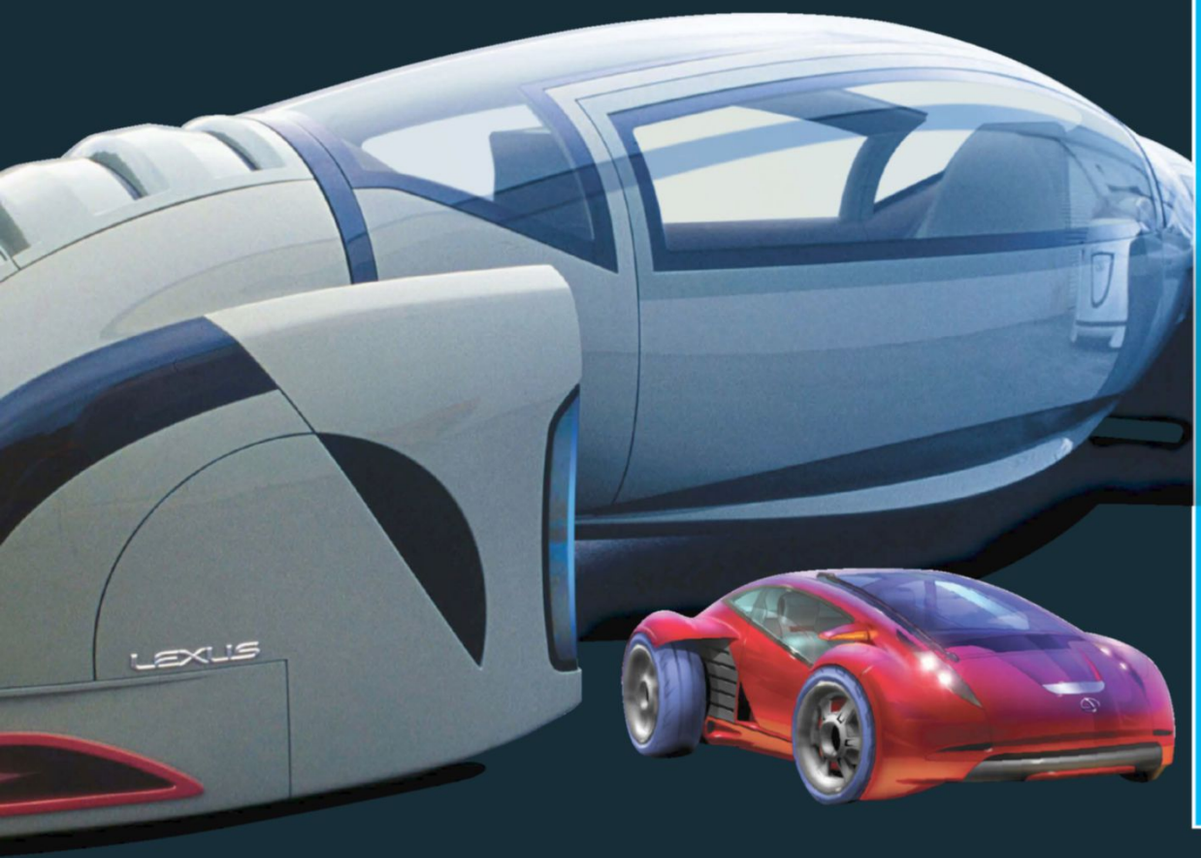
It's clear that *PULSE* is the collective result of Belker's work with both real and fictional automobiles, framed with the wondrous cinematic presentation that forms part of his day job. Yet still, the most inspirational aspect of his story is how he came to be in the position he is; how he's never followed a single thread, instead deciding to gamble in order to pursue work that he finds creatively exciting. We ask Belker if it seems crazy, on reflection, that two massive turning points in his life came seemingly out of the blue and changed everything. "Yes, it is," he admits. "But you know, I think that everything happens for a reason. I truly believe that. Do you grab the chances, or do you let them slip by? It was lucky I was in that mindset, and that I grabbed [them]."

E *PULSE* considers every detail of future racing, from the practicality of the races themselves as well as the racing spectators

F modo enables Belker to readily bring his work into 3D, yet it's the speed and simplicity of KeyShot that makes it his renderer of choice

G The book presents a colourful vision of the future with a touch of the extraordinary – Belker also discusses how the fictional science of this racing might function

> "I think everything happens for a reason. Do you grab the chances, or do you let them slip by? It was lucky. . . that I grabbed (them)"



MINORITY REPORT

Harald Belker discusses one of his memorable projects

It wasn't tough for Belker to narrow down what his favourite project was – the 2002 film *Minority Report* was a highlight, as it brought his design work right into the core storytelling of the movie. "I think the story was solid, but the subject matter meant that we really could freely think of the future, and not in a *Star Wars* way, where everyone flies around, but the future in a plausible and possible way, by solving issues." This involved creating a magnetic-levitation method of transportation, and later, a more functional sports car. Belker explains: "The mass-transportation system... we focused on for a long time. That was supposed to be the only featured transportation system for the elite that lived in the city – today's mass transport wasn't really an option, where you get on a bus etc! The idea of individual mass transportation was the groundbreaking design, there, where the capsules that go up into your living room were your piece of the transportation system. To that extent it was really cool to work out the whole system. You see only a small portion of it in the movie, but we designed the whole [thing].

"The sports car was an afterthought. All of a sudden in the story, the lead character had to leave town, so let's design a sports car for him. It got much more attention, but the really cool thing for me, was the maglev system."

Concepting
Modelling

Software used in this piece

3ds Max Photoshop

Design a muscle car

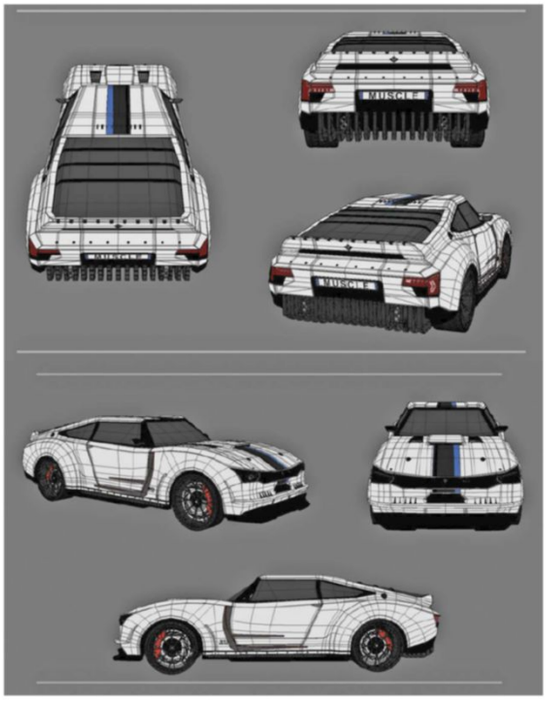
Muscle Car: MC5-D1 2011

This muscle car was designed to showcase the key aspects of concepting and modelling a car to take you from start to finish line so you can create your own cool vehicle assets

Artem Volchik is a senior 3D artist at Blizzard Entertainment, most recently having worked on *Halo: Reach* at Bungie

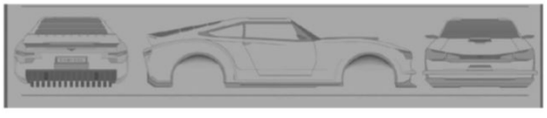
This first instalment of an extended two-part tutorial will examine the conceptual and modelling aspects of designing and creating a muscle car. The concept was created in Photoshop and the model worked up in 3ds Max, so some experience with these programs will come in very handy. In this tutorial we will touch base on a few key steps of designing and creating a 2D concept to work from in 3D, which will involve gathering reference and drawing sketches, before moving on to finalising the concept.

We will also provide an overview of the modelling process, a breakdown of the required elements, a universal workflow that can be applied to various modelling packages, plus explore some challenges that may arise when converting the car into three dimensions. Finally we will take a look at a couple of specific areas of the car and work through the step-by-step process to reveal how to really pimp your ride!



Concept

This concept displays classic muscle car visuals mixed with more exaggerated curves, modern accessories and futuristic lights. The goal was to keep the look of a true muscle car while improving aged aspects of the great classics.



01 Reference for design

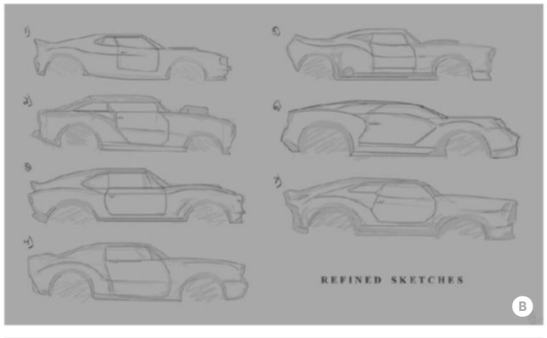
Initially when designing an asset such as a car, it's best to start with a lot of reference images for inspiration and direction. This is as simple as doing an online image search. Gathering the right reference is very important and it's easy to get caught up in shuffling through tons of really cool images, so stay focused and gather the images that are right for your project. Look for things that you know you want to push in your design and keep them right in front of you to ensure that you don't forget about them as you're working Ⓐ.

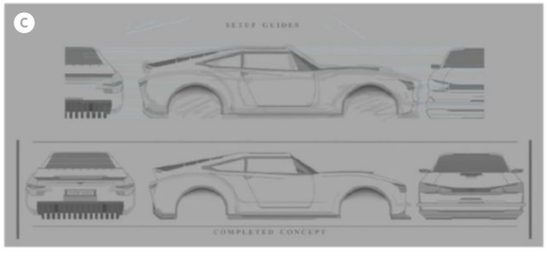
02 Profile sketches

A good first step is to create profile sketches. These are quick and fun to do, simply done to draw out some ideas. Think of these as your thumbnail pass for a vehicle, so don't get too caught up in the fine details. Once you are happy with the rough sketches take some time to clean them up and pull out the most interesting shapes for a better look at the design. At this point it's a good time to also play with three-quarter aspect sketches and/or a rough block-out model of specific sketches to help visualise your design Ⓑ.

03 Final concept and setup

Pick a design to take to completion and take some time to set up guides that will help you. Something I personally use is a group of reference lines. This includes a layer in Photoshop that indicates the important points to carry across when building additional angles of the concept, such as a front and rear view. I also create specific reference lines for certain angles to remain consistent throughout the design. Once you've set up your file you can work on finalising your concept. You should think about this concept as a thorough guide for modelling, but allow room for the model to evolve so that you end up with a design best suited to 3D Ⓒ.





behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Artem Volchik

3DArtistonline

Username: Artemstudios

Personal portfolio site
www.artemstudios.com

Country USA

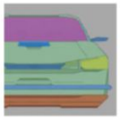
Software used
3ds Max, Photoshop

Expertise Artem's primary speciality is hard-surface 3D art for current and next-generation games. This includes prototyping and creating weapon and vehicle assets and their individual pipelines within a project

Ⓐ This compilation of images highlights some things that I felt were integral to the result I wanted to achieve

Ⓑ Here are some rough profile sketches and their secondary clean-up pass, showcasing the designs more clearly

Ⓒ Setting up your file is an important step to completing an accurate and well-thought-out design

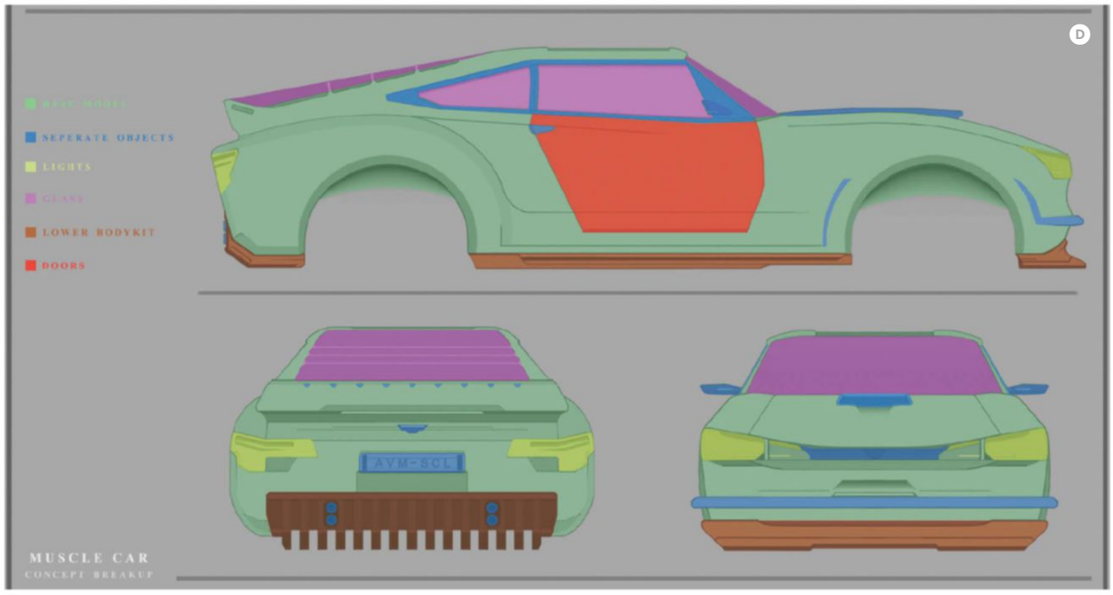


Prepare for modelling

Take some time to set up your model file and examine the concept

Problems & solutions

Translating from a concept to 3D has its challenges. Part of this is finding a balance between being faithful to the concept and making adjustments to what looks best in 3D. If you are working from another artist's concept work, it is best to communicate as much as possible with the concept artist. Talk about potential issues and work to provide the artist with alternative solutions. Look ahead for areas that may not translate well into the 3D model. Your knowledge as a modeller should help inform concepts of any constraints the 3D asset may have. If you are working off of your own designs you should allow yourself the freedom to experiment with any necessary areas to produce the best result. Sometimes it's good to leave some unknowns in the concept to explore in 3D. This will also enable you to utilise both 2D and 3D to pin down the ultimate final design.



04 Concept breakdown

One step I take before modelling my vehicles is nailing down how I am going to build the model. My approach to how these are built out is in a very realistic manner, based on seams and pieces that are attached. The doors, lights and windows are separated from the main car body. Then the additive objects such as the front bumper, lower body kit, mirrors, door handles and licence plate are also separated. This helps visualise how to approach the model and lightens the load of trying to create a clean mesh with all of these pieces built into a single object D.

05 Background setup

Since you have your concept completed in at least a profile view you should set up your model file with a flat plane to project the concept onto. Whether you split up your concept into front, rear and profile sheets or maintain it on one sheet in the viewports is up to you. This is a very helpful step to complete when working from any orthographic reference E.

06 Where to begin

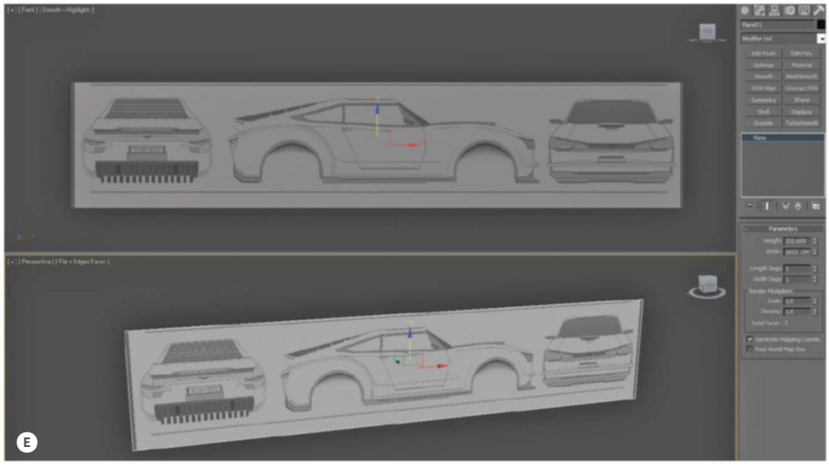
It's time to jump into modelling your car, but where do you start? Really you can begin anywhere you feel most comfortable, but I usually start with the main body – or more specifically the wheel well on the main body. The reason for this is because it is the most rounded end point of the design that will help dictate the edge flow. This is also a good area to work on because it usually closely flows into areas of the car that require you to work in other views F.

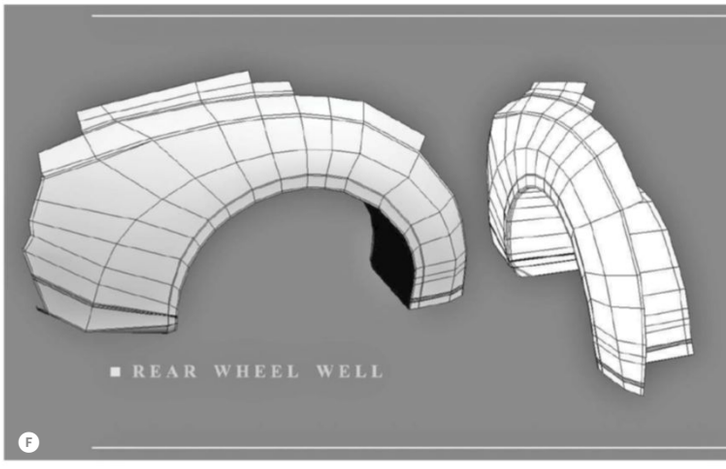
> If you are working from another's concept work, it is best to communicate as much as possible with the concept artist... Look ahead for areas that may not translate well into the 3D model

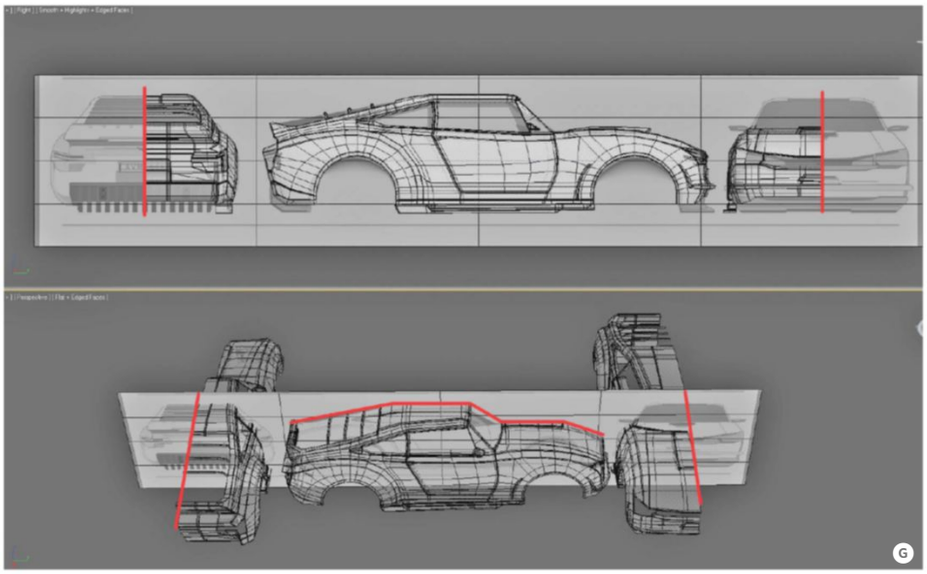
D Breaking up the concept is a good first step to understanding how to build the model

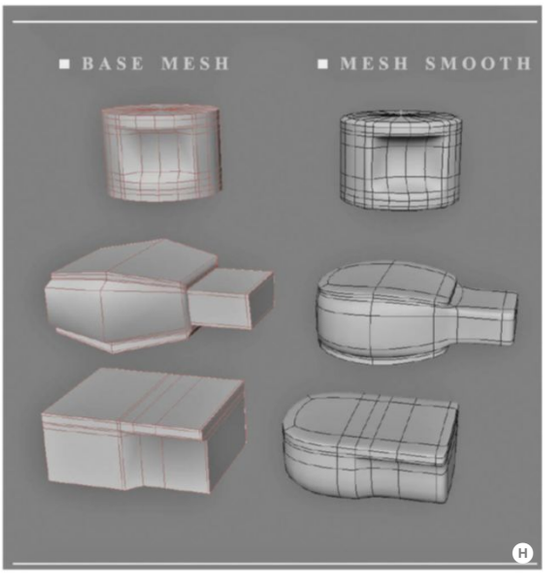
E A perspective and front view of the image plane displaying the concept image to model from

F Because this area requires a more specific shape it's a good starting point to get down first









Further visualising in 3D

Part of what I try to push into my car designs is broader areas that contain an interesting material coupled with smaller areas of interest that include much finer detail. I feel it's very important to push your design with traditional artistic principles to maintain a strong silhouette and interesting primary shapes. In the concept I created I already indicated various areas of material and geometric changes with separate grey values. I tend to carry this across in 3D and create a few materials with flat values and assign them to my asset as I model. Doing this enables me to get a better visual sense of the specific model being created and how the detail is breaking up throughout various angles. This way I can tell how much of a focus there is on the broad detail, and if there are enough satisfying small details in the model. Whether you use refined elements of material or geometry to achieve this detail, creating materials of different values or types (car paint, chrome, rubber, carbon fibre, etc) is a great way to inform yourself while you are working.

07 Instancing and symmetry

Once you've entered an area that requires you to shift views, whether it's the front, rear or top, you've reached a point where you can start duplicating your geometry. You can instance or apply a Symmetry modifier to your object. In the example shown I am instancing my car three times; one for the opposite side, one for the front and one for the rear. Doing this will enable you to focus on one area of the car while being able to see how it aligns to your concept's additional views G.

08 Clean modelling: MeshSmooth

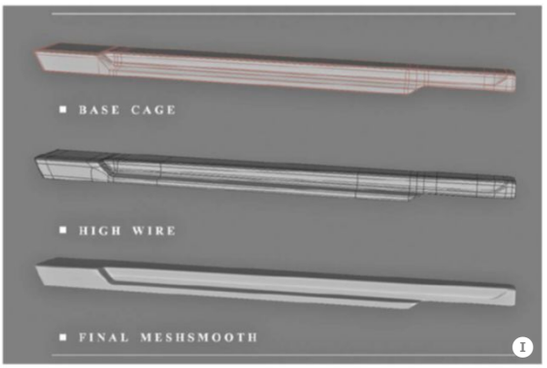
Before we get too far, I'd like to take a few steps to go over some things to keep in mind while continuing to model. This vehicle was modelled with a Sub-D modifier to achieve the final result. This method has many benefits, but there are a few things that you need to watch out for. Understanding how mesh smoothing an object deals with your mesh edges at certain angles will help you to keep a clean model and achieve a more impressive end result. You can perform a few tests on either your current model or on a newly created simple primitive object H.

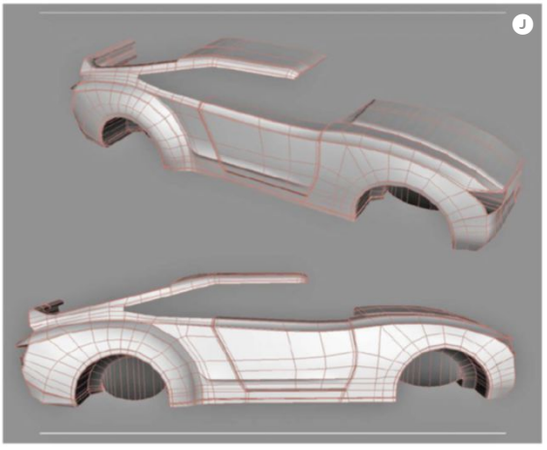
09 Clean modelling 2: Controlling edges

One method of maintaining hard edges for high-resolution modelling is to add additional edges to control your base cage. It's usually a good idea to do these mostly, if not all, by hand. When you approach a harsh change in angle on your design, and you'd like to keep your model from continuing to round off you can add a supporting edge loop. We do this for areas such as the outer wheel well I.

10 Clean modelling 3: Simple topology

Another important aspect of modelling using this method is keeping the topology of your model clean. It's easy to get carried away with adding extra edge loops onto your model early on, but this will only cause you frustration later. Keep it simple and use only the necessary edges for your base cage. By doing so, you'll avoid a lot of headaches later down the road when you mesh smooth your model. Keeping your topology as simple as possible early on will result in an easier and more impressive model to work with J.





G Instancing your object enables you to work on your model in separate and precise views

H Here are a few separate pieces showcasing how certain edge flow translates with a MeshSmooth modifier

I An example of maintaining your edges to achieve a proper mesh-smoothed result on the body kit side skirt

J In this image you can see that each edge has a purpose and no edge disrupts the flow of the model

Artist showcase

Artem Volchik

I've been working in 3ds Max making assets for over ten years, and I still feel like there's always something new to learn every time I make a new asset. There's always something to improve on, whether it's finding a way to become a more efficient modeller or learning a new technique for rendering; there will always be a way to better yourself in this line of work.

450 GTS **3ds Max, Photoshop (2011)**
A personal car design, this is a four-door supercar. The goal of this model was to attempt to design an aggressive yet spacious next-generation supercar

LM760 **3ds Max, Photoshop (2010)**
This is another personal car design. This car was inspired by modern-day supercars such as those by Lamborghini. The goal was to create a harder-edged, modern-day supercar

A-010 Bomber **3ds Max, Photoshop (2010)**
This model was a personal creation with the intention of modelling a futuristic, stylised jet bomber

Hot wheels

A few key steps to get things rolling; nail the muscle car's wheels

11 Wheels

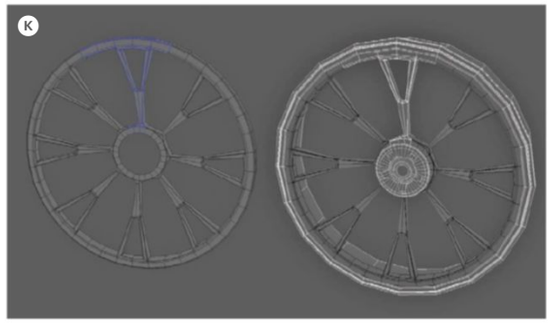
First, start by creating a 20-sided cylinder with some top front faces. Maintain the pivot of this object from the original cylinder; this will enable us to re-create our original cylinder precisely using instances of this new simpler piece. Instance this piece, rotating it 45 degrees each time until you complete your circle. You can now extrude the edges downward to create spokes for your wheel. You can use this method to experiment with a wheel design; I went with a multiple, thinner-spoked design Ⓚ.

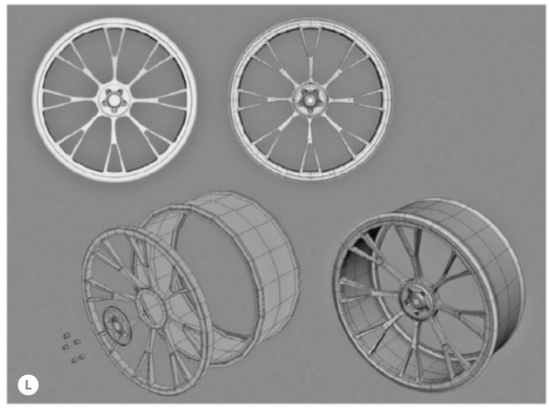
12 Wheels 2

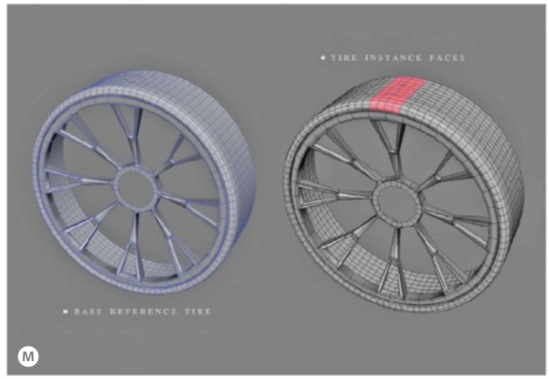
Once you've created the front of your wheel you can proceed to flesh out the outer rim and the depth of the wheel itself. I've separated the wheel spoke instances with the outer rim to make the creation process less complex without taking away from the design or quality of the overall wheel. Afterwards, it's good to make a pass including smaller details such as bolts and a front cap or logo for the wheel. These little details will help to provide a finished quality Ⓛ.

13 Add the tyres

Now it's time to get some rubber on those wheels. Create a tessellated cylinder around your wheel at the thickness you want. Don't worry about the tread for now, but build out your tyre as if it didn't have tread at all, so make sure to round off those corners of the tyre that approach the outer wheel. Now we will select an even number of rings or faces to instance from this group, in a similar way to how we created the wheels Ⓜ.







Improve on real life

If you're an artist interested in designing your own cars, take a look at the successful models of modern and past vehicles. Consider what you would do to improve them. This blend of old and new can help inspire and bring out interesting designs and ideas to change the way you think about creating your own cars in the future.

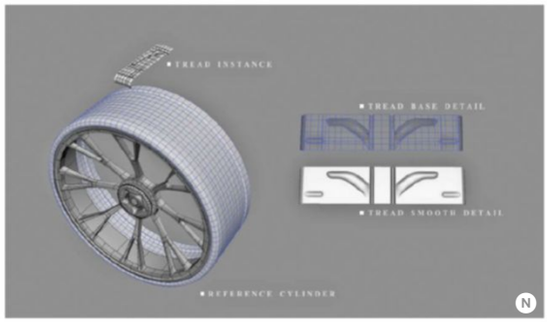
Ⓚ Instancing the inner wheel displayed here makes it easier to create complex wheels

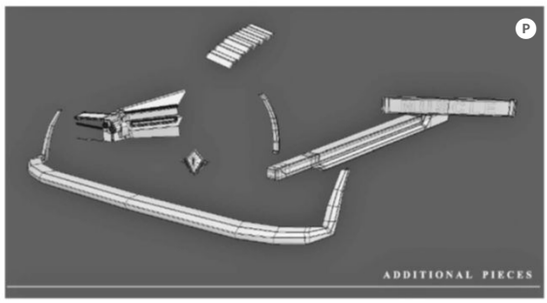
Ⓛ Here we see the various layers of the wheel and the final smoothed result

Ⓜ The base reference tyre and the section we will instance from is shown in this image

Close to the finish line

With the end in sight, it's time to make final tweaks





14 Add the tyres 2

Now that we have a section of the tyre separated, it's time to detail it out. Use the necessary cuts and extra edges you require to create an interesting tread pattern. Make sure to adjust your edges according to the curve of this piece of the cylinder section though. This is important to retain our precise cylinder circle as adding extra edges without adjusting to the natural curve will alter this N.

15 Add the tyres 3

Once you've detailed the tread, repeat it as an instance as many times rotationally as needed to complete your circle. If there are any adjustments to be made, you should see them at this point and be able to modify the base section to fix them. Now we have a pretty decent base tyre to add extra detailing to if needed O.

16 One last pitstop

Part of the last stage of modelling my cars is sweeping through the car back to front adding the extra elements of detail. This includes the objects that sit on top of the car body such as the door handles, mirrors, lights, licence plate, etc. I've also gone through and added little bolts and accessories to spice up the attitude of the final model P.

17 Cross the finish line

At this point I always suggest taking a step back and looking at your model so far. Chances are it's probably about 80-90 per cent there. This is good, because the majority is fleshed out and detailed and should look great. The remainder comes from the extra touches you can personally place onto your car. These could be decals, extra little lights, texture such as wear-and-tear, additional vents or body kit work. Whatever it may be, take some time to really push your muscle car until it's ripped Q!

The second leg

In the second part of this tutorial, over the page, we will explore the steps taken to set up this car model for rendering. This will include creating unique materials, textures and specific details, and a couple of methods of setting up your files for achieving a final high-quality render.

6 hours render time
Resolution: 3,000 x 1,500

N The detailed tread pattern we will repeat and the reference mesh it was constructed from

O Displayed in this image is the smoothed wheel and final repeated tyre tread

P A collection of the smaller elements modelled for the car which really bring it to life

Q One of the final images of this car model with the all-important final details applied

Texturing
Rendering

Texture and render a muscle car

Muscle Car: MC5-D1 2011

Texture and render a muscle car

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Artem Volchik

3DArtist online

Username: Artemstudios

Personal portfolio site
www.artemstudios.com

Country USA

Software used
3ds Max, Photoshop

Expertise Artem's primary speciality is hard-surface 3D art for current and next-generation games. This includes prototyping and creating weapon and vehicle assets and their individual pipelines within a project

Software used in this piece

3ds Max Photoshop

Following on from the previous tutorial, where we saw how to model a muscle car, in this concluding part we will apply materials and render out the final scene

Artem Volchik is a senior 3D artist at Blizzard Entertainment, most recently having worked on *Halo: Reach* at Bungie

In the second instalment of this create-your-own-muscle-car workshop, we will focus on creating and rendering a scene for the car model. There is a wide variety of renderers and render methods out there, and many ways to achieve a great result. Something to keep in mind when approaching the creation of a 'final render' is the need to have a firm grasp on your end goal.

Rendering a piece successfully is a skill in itself and there are many challenges that come with it. One of the benefits of a single render is you can adjust all of your scene to fit your camera angle exactly, but on the flipside you must achieve a very high-quality bar in every aspect of your render. Break down your render goals early on, focus on what you are really looking to achieve, then go from there.

We'll be covering how to create the geometry of the scene, looking at textures and materials for the car and its environment, setting up lights and, finally, exploring two slightly different methods for achieving the fine-tuned renders. We'll be using mental ray (in 3ds Max) and Photoshop for this tutorial, but most of the general process can also be applied to other programs.

Pimp your ride

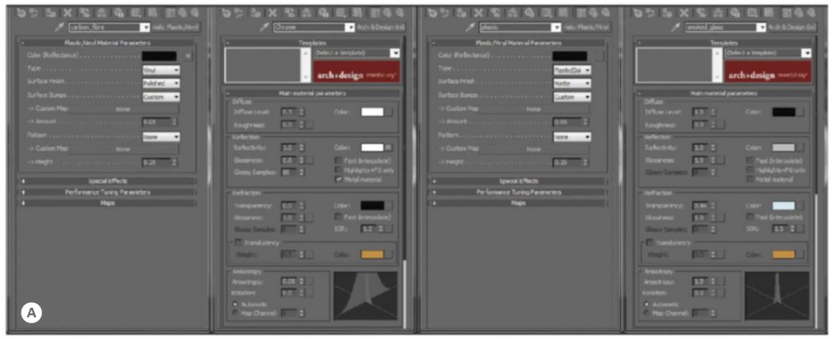
A little texturing goes a long way…

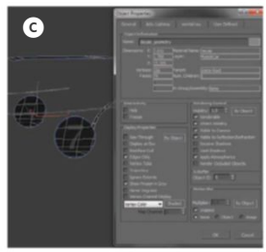
01 A mix of materials

A well-polished model typically has a good range of materials involved. Creating various materials for the car will really push the look of the vehicle up a gear. Materials help to introduce interesting details, break up the model into more consumable areas, and add that extra bit of believability to an asset. Some materials used on the muscle car are car paint, matte/plastic, carbon fibre and chrome, etc. Materials were created utilising mental ray and Arch & Design materials as a base which were then adjusted to fit the needs of the model A.

02 Create the textures

The textures on this car, due to the way the model was constructed, will be minimal. We are relying on procedural materials for the majority of the asset, so we can create smaller texture sheets for more specific details. Taking a step back to look at the model, we see there are some areas that could use additional detail and colour. We've created a carbon fibre tiling texture and a 32-bit alpha decal sheet TGA file to apply to the model's materials B.

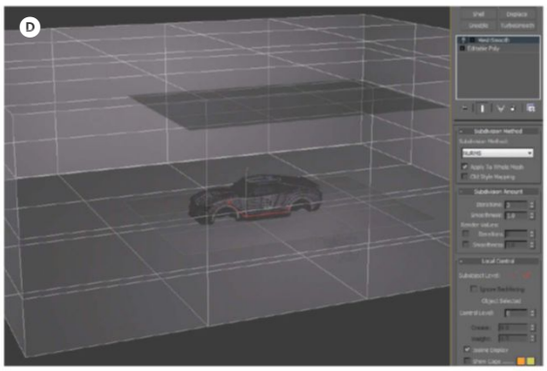


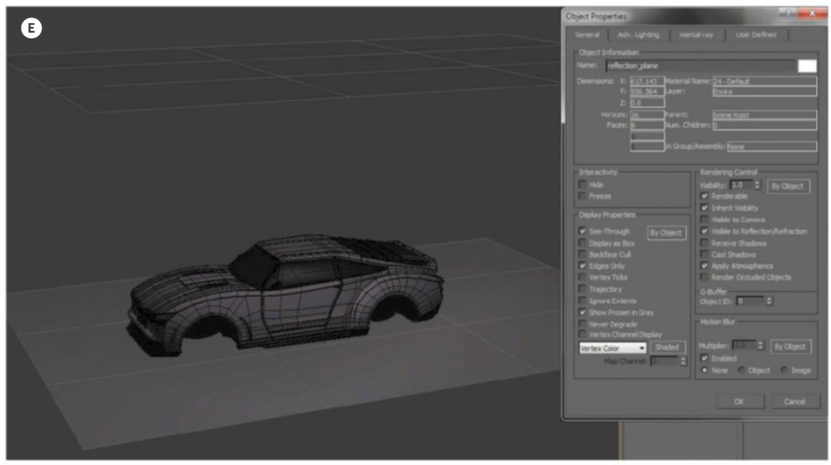


A Just a small selection of the many materials used in the final renders

B Carbon fibre texture and material settings for the decal texture

C Make sure to uncheck Cast Shadows on floating decal geometry





Problems and solutions

Choosing what kind of scene to use for showcasing a model can be difficult. Plumping for realistic can result in a lot of extra work if you need to build out an entire set. This can also be distracting and detract from your final image if the scene becomes too busy with details. Building too simple a scene, however, poses its challenges, and may result in your scene not being detailed enough to be interesting. This goes back to making sure you take the time to define what the goals are for your piece. Start simple and expand on what works to support your model. Be sure to research any details you are not familiar with, and find as much reference for what you are trying to achieve as possible. There's no substitute for having a visual to reference even a single aspect of your goal. This can be either a still shot of a setting, interesting lighting for a scene, camera angles, postprocessing effects or even another's artwork that you admire. I recommend creating a reference sheet filled with any inspiration for your scene.

03 Place the textures

We'll need to create a material for the decals to be used, and apply the carbon fibre to a material. I create simple geometry planes to float above the car for the decals. This geometry will be used as painted decals and will need to be set to not cast shadows to avoid any shadowing onto the geometry it sits on. For areas utilising the carbon fibre, we will need to apply a UVW map modifier to the geometry and set it to box map, inserting a tiling number that represents the desired scale C.

04 Build a clean room

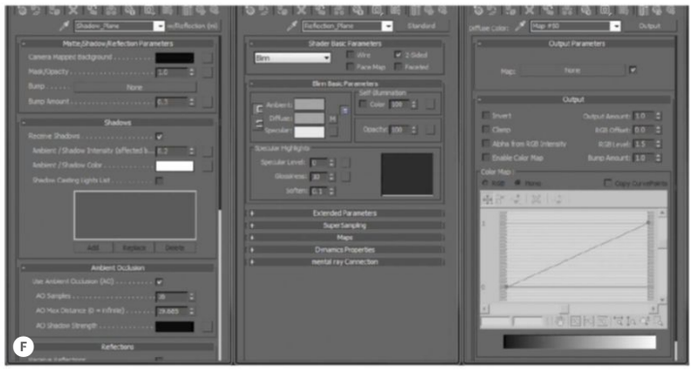
For the muscle car renders I created a clean room, inspired by realistic photography of cars taken by professionals. The clean room consists of a geometry box mesh tessellated a few times to retain the box shape and then applied with a MeshSmooth modifier to soften the side transitions. A mid-grey material is applied to the geometry. The benefits of the clean room is that it's a simple background, with soft lighting fade and soft bounced light and reflections D.

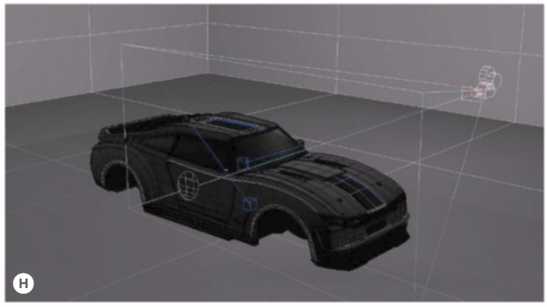
Overall goals

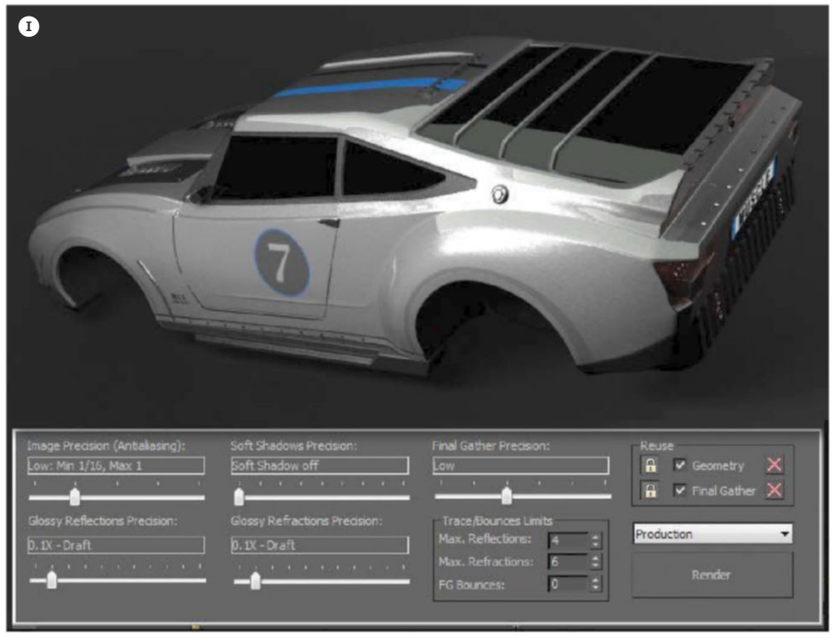
There are a few aims I had in mind for the final renders of this car from the word go. Namely, I wanted to create believable, bold and stylish renders that highlighted the model and included a subtle supporting background.

D This shows the clean room built around the car model

E Turn off Visible to Camera on your reflection plane, as well as the Cast Shadows option







F The material settings for the reflection and shadow planes

G The lighting rig is displayed in this image, along with the key light settings

H Shown here are a couple of cameras with multiple keyframes containing settings at various angles

I Low settings save render time to test materials and find any problem areas

Exceed your limits

Something that I try to bring into all of my work is finding and pushing the purpose and limits of everything. This can relate to a variety of aspects in 3D and 2D imagery. For example, when constructing models such as this muscle car, I find what all of my vertices and edges are doing, and try to push them to their limit – I want them all to be working hard for me. Experimenting with this helps me better understand edgeflow and construction techniques. When rendering and polishing renders I isolate the things that could bring some more excitement to my final image, and push them out even more. This is art, and there are no rules when it comes to wanting to create something really cool! Focus on smaller aspects of your work and experiment with how you can take them to the next level. This is a great way to better yourself and your work one step at a time. Find where your limit is, and see if you can exceed it.

05 Shadow & reflection geometry

We'll need to create a couple of geometry planes for shadow casting and reflections; these should be two to four times the size of your model. The reflection geometry will be used specifically for casting specific reflection planes onto mainly the car paint and glass. The shadow plane of geometry will be used for our composite rendering method, but is simple and generally handy to know about. Place the shadow geometry plane directly under your model and open the Object Properties. Uncheck the Cast Shadows, Receive Shadows and Visible to Camera boxes. Now place the reflection geometry midway between your model and the 'roof' of your room E.

06 Shadow & reflection materials

We'll need to create two materials now to apply to our new shadow and reflection geometry. The shadow material will be simple, and can be created by selecting a new material (standard) and clicking on Matte/Shadow/Reflection (mi). Apply this material to your shadow plane of geometry. Create a standard material and set the Self-Illumination parameter to 100. Under the Maps tab check None next to Diffuse Color and select Output. Under Output set the RGB Level to 1.5. Now apply this to your reflection plane F.

07 A little light work

It's now time to add some lights. The lighting in the scene consists of a three-point setup. Three photometric free lights are created. These are all set to cast raytraced shadows, with Light Distribution (Type) set to Uniform Diffuse, with to Emit light from Rectangle and Light Shape Visible in Rendering enabled. The key light is placed angled slightly downward from the side at an Intensity of cd 500. An additional fill light is placed in front of the car at cd 200, and a rim light created at the opposite side at the rear of the car at cd 250 G.

08 Cameras and angles

Setting up cameras and angles is an important part of achieving a well-balanced render. Start with creating a camera and moving the target to the centre of the car. This will retain your general focal point while trying out various angles. Once an angle is found play with rotation and FOV of the camera to dramatise your render. Don't forget to look for inspiration and reference in existing real-world photography of cars in books, magazines or online H.

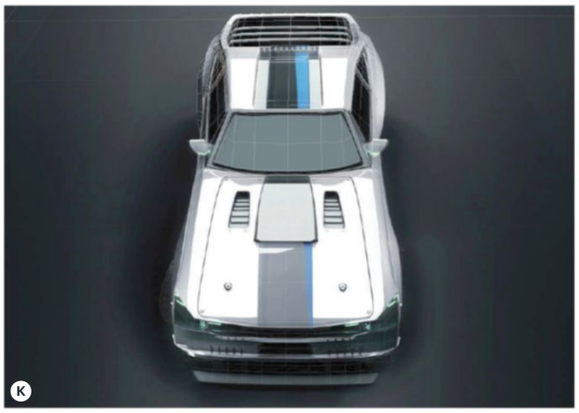
09 Rough renders

Once the scene geometry, materials, lights and camera are set up it's time to do a few draft renders. Set your render settings to very low to increase render time. Another way to save time is to lower your image resolution and also turn off Soft Shadows. Based on many factors of your scene the render settings may need to be adjusted, so the purpose of doing these rough renders is to be able to iterate quickly and not waste hours trying to pin down problem areas I.

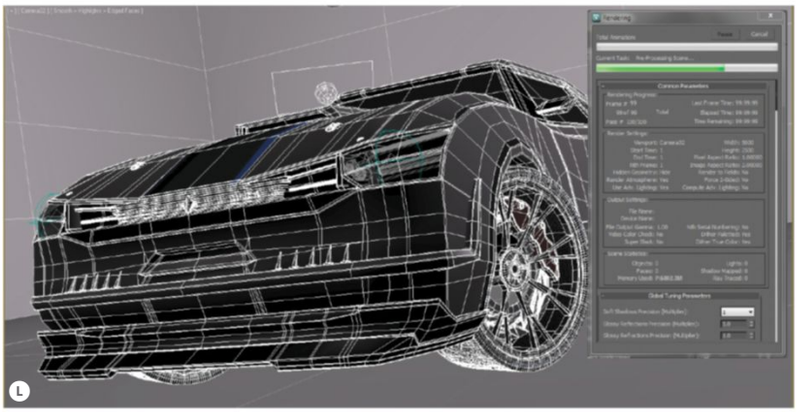
Final rendering

Two workflows for nailing that render

J Here we see custom camera angles and light settings for the final renders at different keyframes



K A construction shot of the muscle car scene from the final angle we decided upon



L The complete scene will render all of your scene contents, but be warned, it may take a while

10 Tweaking the scene

After creating draft renders, take some time to fine-tune your scene settings, materials, geometry and/or lighting. One of the benefits of creating a still scene is being able to adjust all of your settings for that particular render. Take advantage of this by modifying anything you need to in order to showcase your muscle car to best effect J.

11 Pick your method

There are two different methods I use to create final renderings. The difference between these two workflows isn't all that great, but based on the needs of the project; choosing the way that fits best could save you a lot of time. Both have their advantages and disadvantages – as mentioned, the project will dictate which one is better to use K.

12 Complete scene overview

The first method is rendering the complete scene. This means, simply, everything is rendered. This includes every aspect of the scene, from models to lighting and shadowing, to postproduction effects. The advantage of this is that all you have to do is hit Render and let it sit. You can set it up for

Artist showcase

Artem Volchik

I've been making assets with 3ds Max for over ten years, and I still feel like there's always something new to learn. Whether it's finding a way to be a more efficient modeller or learning a new rendering technique, there will always be a way to better yourself.

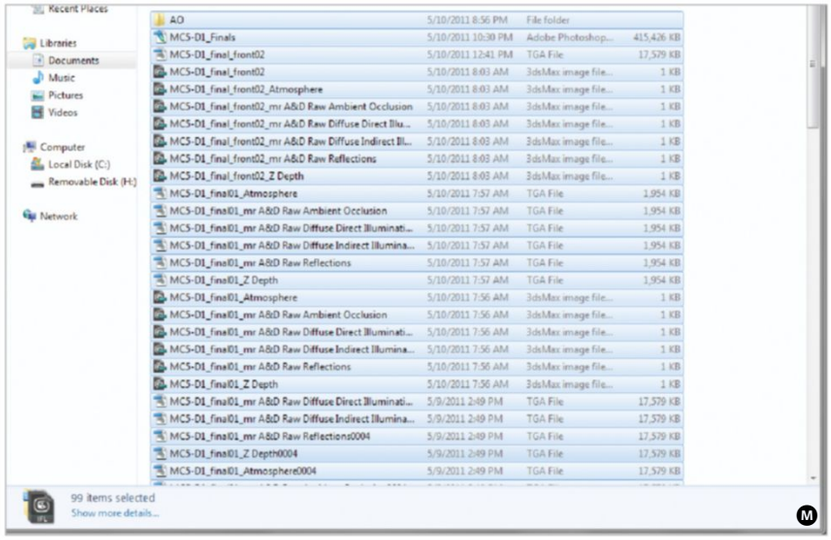
Overlook Concept **3ds Max, Photoshop (2010)**
This is a concept I created using 3D and 2D programs. Base geometry was created in 3ds Max and coloured and finalised in Photoshop. It displays futuristic fighter jets deploying from their stationed high-rise hangar

Falloff Concept **3ds Max, Photoshop (2010)**
This is another concept made by utilising both 3D and 2D skills. Creating some base geometry in 3ds Max established a great foundation to bring to life this floating port that's linking up mysterious towers

V-Scout **3ds Max, Photoshop (2010)**
A concept created to design an interesting yet complex machine-operated motorcycle. The main purpose was to make an aggressive, cool model that could stand on its own two wheels

Render settings

Details for setting up the two different render methods



Ⓜ Splitting your render elements may be quicker but could leave you a lot of files to sort through!

Ⓝ Complete scene render window showing preferred settings for this method

Ⓞ This is the ambient occlusion material and render settings for the separate files

Ⓟ The render elements saved per camera angle to put together the final renders

videos or just a handful of stills to render one after the other. A disadvantage of this is a pretty big one: usually render times are very high and can even last for several days, depending on your preferred image size Ⓛ.

13 Composite rendering overview

The second render method I use is one that requires the compositing of several rendered images. This works really well for still images and I prefer to use this whenever I can. The advantage of this method is a lot of time saved on rendering, plus faster results at a fairly high quality. The disadvantage to this method is the need to spend some time compositing your images manually and making sure you have all the render passes baked out that you may need Ⓜ.

14 Complete scene setup

Since I usually render at a high resolution, for the complete scene setup, all of the mental ray renderer settings are set fairly high to ensure good quality. Antialiasing is set to Very High (Min 4, Max 64), Soft Shadows to 2x – High Quality, and Glossy Reflections and Refraction Precision set to 1x, which is the default setting. I usually set the Final Gather Precision to Low, due to additional time needed to calculate and the difference it makes to my machine personally isn't worth bumping it further than that Ⓝ.

15 Composite render setup

With the composite rendering method I break my file into two files. One file is set up for materials, colour and separating render elements. The second is set up for the shadowing and ambient occlusion. The first file you would set up as you would for a complete scene, but turn off Soft Shadows and hide your Matte/Shadow plane. For the second file you'll want to create a new mental ray material and select Ambient/Reflective Occlusion for the Surface and apply this to everything on the model. Be sure to hide any glass geometry so it doesn't get in the way of rendering the AO. You'll want to hide your clean room geometry and make your shadow plane visible for this render – plus set your Soft Shadows to 2x Ⓞ.

6 hours render time
Resolution: 3,000 x 1,500

16 Composite render setup 2

For the composite rendering we'll need to add additional render elements to our primary colour/material scene to break out. Once these are all rendered out and your second AO file is rendered you may put these all together in Photoshop. I tend to utilise the alpha from the renders to split the car from the background for easy selection and adjustment. At this stage feel free to pop out certain areas if you need to. These render elements are made to be put together any which way you like, so experiment and pimp your ride with PS effects Ⓟ!

> For the front lights I made a Bump map in Photoshop to mimic the lens. I used it in the Bump channel and minimally in the Diffuse channel. It's important not to make it 100 per cent clear to get a more realistic effect

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Maurice Panisch
3DArtistOnline

Website www.maurice-panisch.de
Country Germany
Software used CINEMA 4D, V-Ray, Photoshop

AC Cobra 2010

I'd wanted to make a render of the AC Cobra for a long time, but never had the spare time around jobs to model one. Coincidentally, I found Glen Johnson's website and saw that he'd modelled one in excellent quality in CINEMA 4D and was giving it away for free download. Bingo! I downloaded it and, after a few days, found time to work on it. I reworked some small parts and started texturing and shading it, and then began to think about a scene to fit – nothing big that would rob attention from the car, but something colourful. At the time I was also in contact with Markus Hanke who had just taken lots of new photographs with matching HDRI spheres and, after a short email, voilà! He'd got it! It was exactly what I was looking for. The rest of the work was all lighting and rendering...

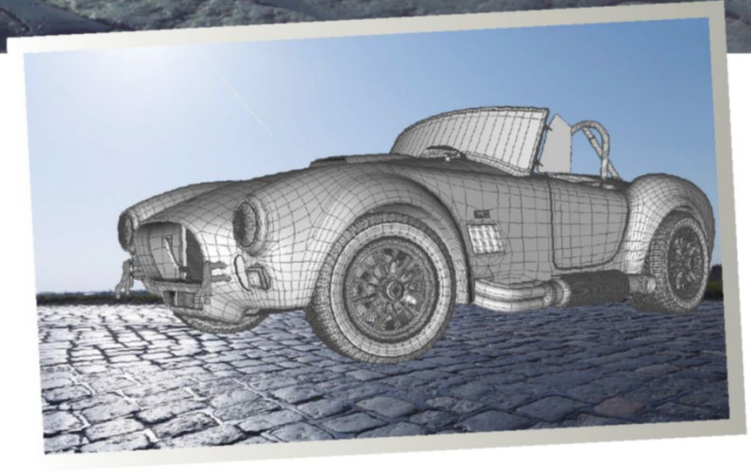
Model: Glen Johnson, **www.glenjohnson.de**
Backplate and HDRI: Markus Hanke, **www.markushanke.de**

> The IOR value in V-Ray is important for realistic car paint for reflections. The surfaces that are perpendicular to the camera will reflect more, while the surfaces that are parallel to the camera will reflect less

"The logo material was made as a single shader with different reflection layers – one was masked with a map for the chrome of the logo and one for the paint"

Software used in this piece

CINEMA 4D · V-Ray · Photoshop

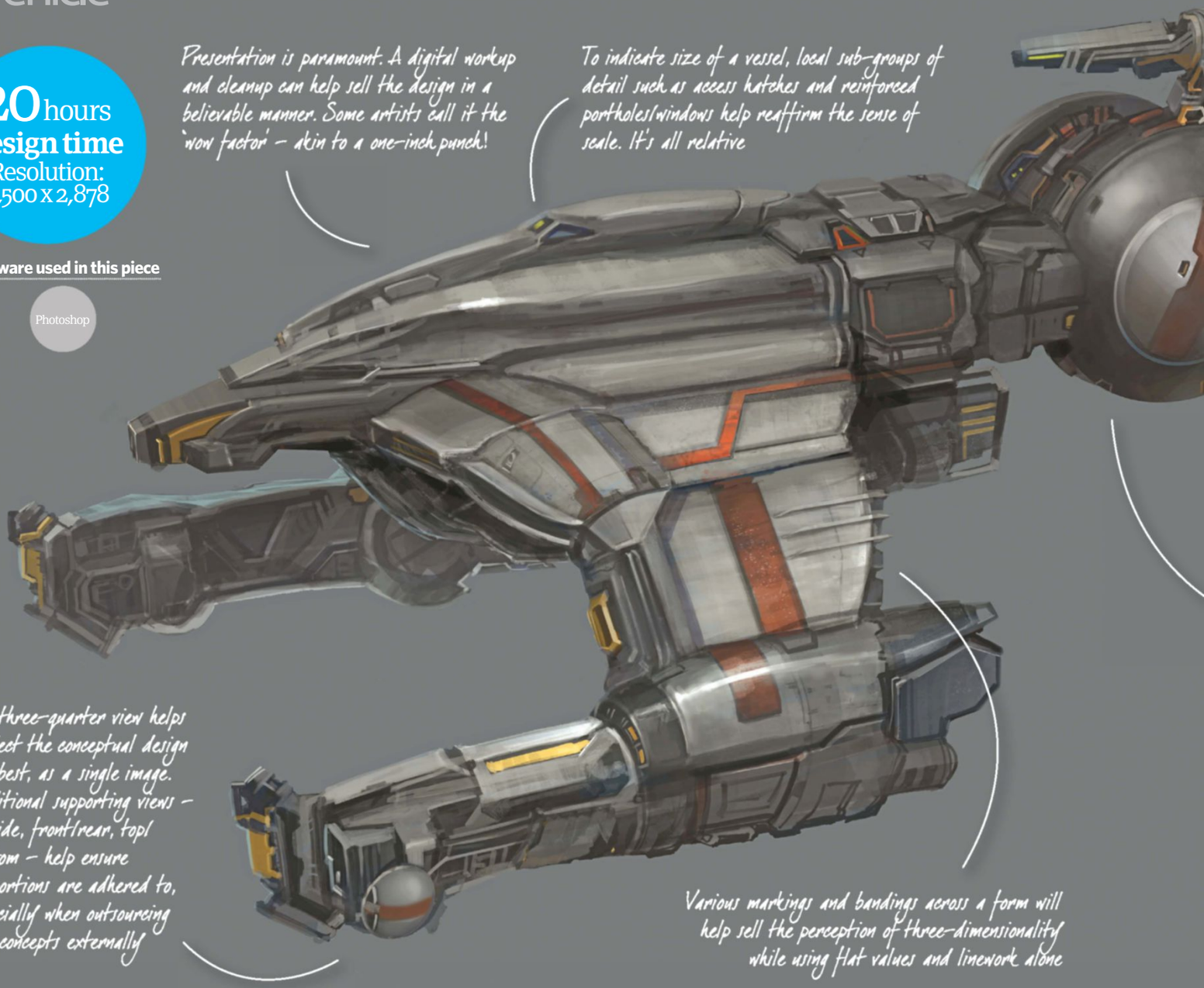


"The lighting isn't that complicated. I made an Infinite light to imitate sunlight as well as an Area light in Dome mode. Then I placed the HDRI to get the light colour of the sky and reflections of the surroundings. Sometimes you'll have to colour correct a little to match the tone of the backplate light"

20 hours design time
Resolution: 4,500 x 2,878

Software used in this piece

Photoshop



Scorpion spacecraft concept design

Scorpio Corvette MX-55 2011

How a unique 2D design for a space-exploration vehicle took shape through its various stages of production

Chee Ming Wong is an artist within the entertainment industry

Concept

A mixture of applied biology, aeronautics and futuristic next-generation materials and technology is researched prior to the start of ideation. This helps provide an informed, functional approach within the construction of sketches and ideas.

Scorpion spacecraft concept design

Large-to-small shapes counterpoised with positive and negative space will help breathe the necessary harmony of aesthetically pleasing design versus over-detailed design

Tonal variation and contrast help reflect the structural and surface textural materials. This is supported by additional 1–2 colour variations

Within this workshop I would like to share a brief snapshot of the everyday processes used to produce a solid concept for the entertainment industry. This will involve a problem-solving and troubleshooting methodology that may explain why certain choices are made or avoided to steer towards the generation of a single design. The process of ideation is very much a mental process, expressed in your medium of choice; a mixed media of basic pen and paper and digital application are used here.

In this instance, we are mashing the idea of a scorpion and a ten-man crew spaceship as an animal-inspired design. The applications of this type of approach are not new and can be seen in everyday architectural and structural inventions, eg robotics, miniature drones and spy planes, applied bat sonar, gecko-like suction, enamel-inspired ceramics and aerospace materials – and so forth.

01 Applied biology ideation

This initial exercise involves a literal abstraction of the *Scorpiones* group – in this instance a mechanised abstraction of the modern and fossil ancestor of the scorpion is explored. Subsequently, the idea of integrated plates of space-age chitin – to represent external surface materials – coupled with concealed elements that can extend/recess as required form the basis of the art direction Ⓐ.

02 Ideation – lots of it!

Detailed sketches of fixed wing – forward claw-like extensions – versus extended tail end – as an observation deck/ventral fire control system – designs are explored. Placement of various attachments, both ventrally and dorsally, provides the impetus to rationalise their function in deep space and atmospheric conditions. The need for landing gears or movable stub wings is a prime consideration here Ⓑ.

03 Everything until now has been a warm-up!

A combination of all the exploratory sketches provides a rich reference point with which to finally begin the design. It starts with groups of shapes via markers. These allow for happy accidents to evolve the design – much like looking at cloud shapes – coupled with an innate knowledge of the previous sketches. Once the main groups and key lines are etched in, a supporting sub-group of reinforcing lines completes the concept design Ⓒ.

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Chee Ming Wong

3DArtist online

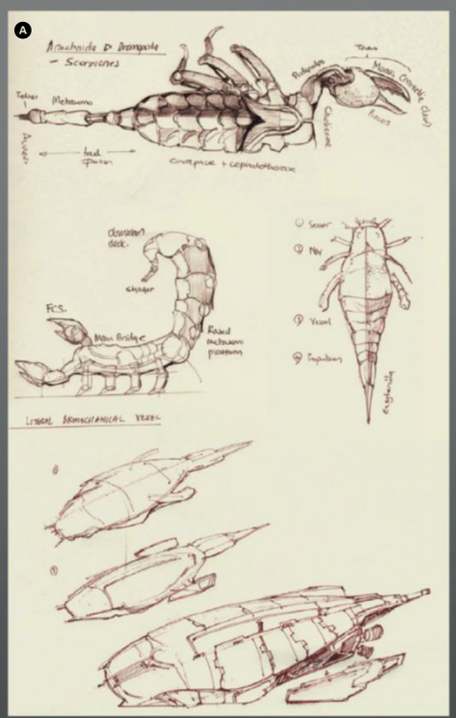
Personal portfolio site
http://koshime.com

Country UK

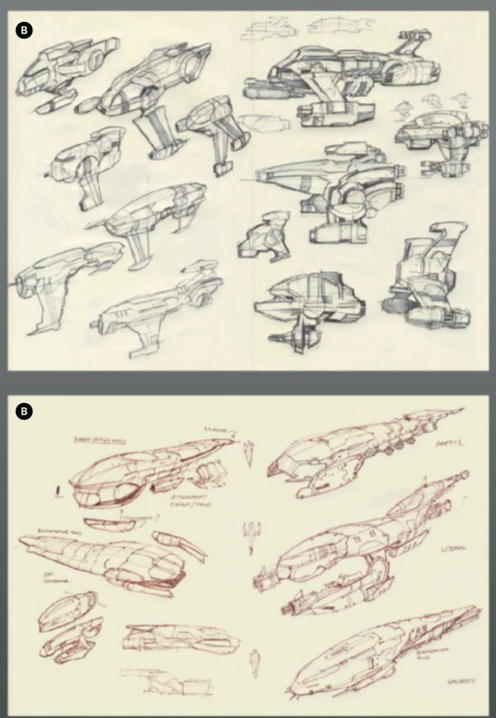
Tools used
Pens (ballpoint, Pilot G-Tec C4 0.4 Brown & Black, G2 0.7), generic marker pens (Prismacolor, Letraset, Copic), marker paper, Daler Rowney 85gsm acid-free ivory cartridge paper

Software used
Photoshop

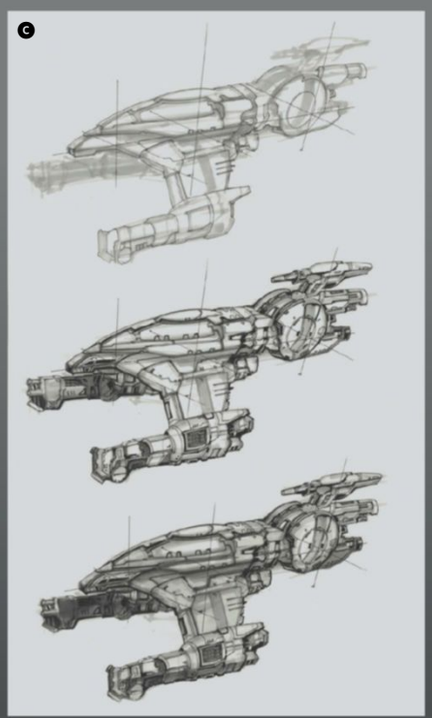
Expertise Chee is an environment and transport specialist within contemporary, steampunk and sci-fi genres



Ⓐ Key features to abstract for an animal-inspired spaceship are the pincers, carapace and stinger



Ⓑ Explore combinations of the key abstractions within a streamline or industrial sci-fi context



Ⓒ Marker explorations and digital workup can help sell the design in a more believable manner

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Wiktor Öhman

3DArtist online

Personal portfolio site http://wiktorohman.artworkfolio.com

Country Sweden

Software used Maya 2011, Photoshop

Expertise Wiktor specialises in working with environments and hard-surface modelling, but is also keen on branching out into concept art and character design

Modelling the Scorpio

Scorpio Corvette MX-55 2011

Part one of this two-part tutorial takes you through the modelling of the Scorpio, aiming for an illustrative finish

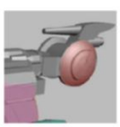
Wiktor Öhman is a 3D artist based in Malmö, Sweden

In this tutorial I will show you how to tackle some of the more complex shapes of this spaceship by following Chee's concept (see pages 110-111), using Maya for modelling and Photoshop for final compositing.

I modelled this ship mainly with the help of Maya's Smoothing Preview function, which is a great help when working with high-poly models. We'll also cover a nifty tool called the Lattice deformer, which – in my opinion – is one of the greatest features when it comes to Maya modelling.

Chee is a fantastic artist and his concept really was a breeze to work with for the most part, but since I was only provided with a three-quarter view of the ship, I'll reveal my process when I had to freestyle, or interpret, some of the vaguer areas, which can prove troublesome.

As is often the case in this kind of project, there were also a few areas that didn't translate very well into 3D that had to be rejigged, but I'll discuss these in more depth later. Now, on to the modelling!

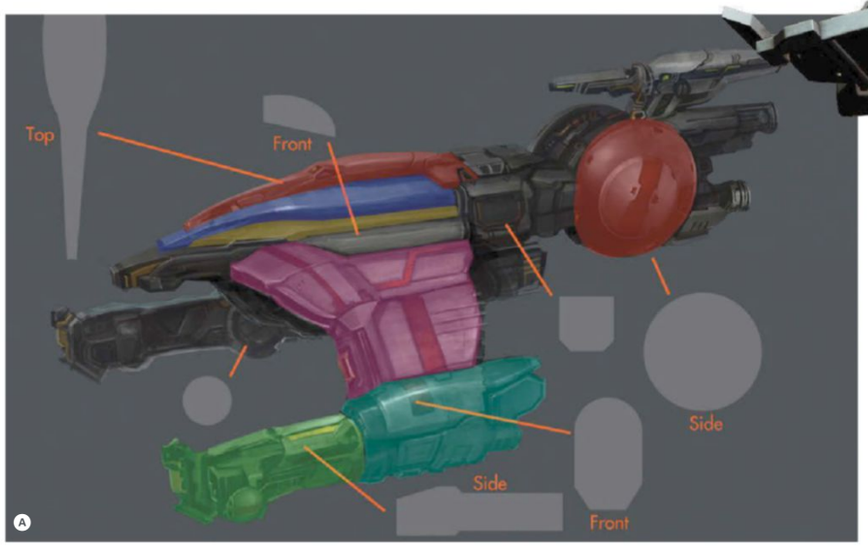


Read the concept

Blocking out the 2D sketch

01 Analyse the concept art

First of all we need to analyse the concept art in order for us to be able to plan ahead. A good thing to do when studying concept art is to break as much as possible up into basic geometric shapes, such as cubes, circles and triangles; it also helps to divide the whole model into different segments. I, personally, tend to stare myself blind at the overall picture, making it hard for me to see the various areas. What I do to try to avoid this, plus the subsequent panicking over the level of detail, is to bring the concept into Photoshop to colour code the different areas, which enables me to see them much more clearly Ⓐ.



A good thing to do when studying concept art is to break as much as possible up into basic geometric shapes; it also helps to divide the whole model into different segments

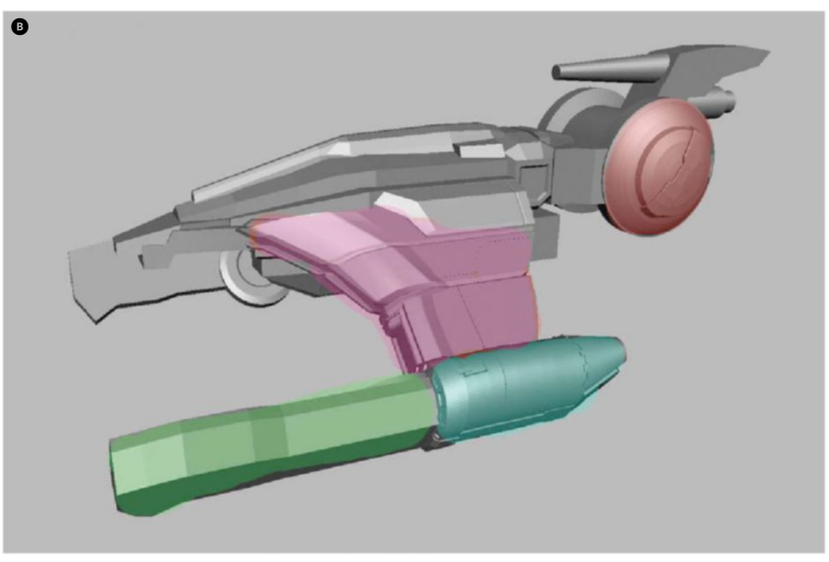
02 Block out the rough shapes

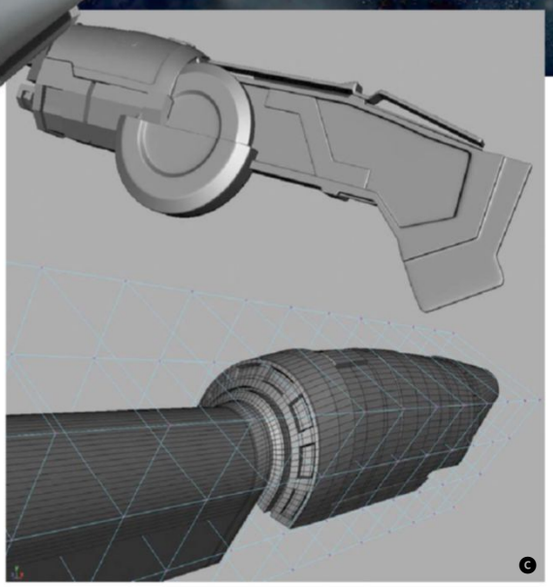
By following the colour coding and geometrical shapes painted in the previous step, I started making a rough blockout. Again, I try to use as many basic shapes as possible whenever I can. When I modelled the blockout, I made the mistake of adding way too much detail, which I came to regret later – so be wary of this. The purpose of making blockouts is to get a feel of the shapes, the 3D silhouette and the general proportions. The reason I regretted adding too much detail in the blockout stage was because I made the next steps harder for myself, as it's more tricky to change high-poly meshes than it is low-poly meshes and the details I added prevented me from seeing the fundamental form. Later on I had to go back and remake many areas as a result Ⓑ.

Modelling

Software used in this piece

Maya Photoshop





03 Refine the shapes

Once you're happy with the blockout and you've made sure the proportions look okay, it's time to move on to refining shapes. The colour coding becomes really helpful here, since it allows me to focus on one segment at a time. If I don't split the work up, I tend to go all over the place and add details everywhere, not really finishing anything. I decided to focus on the wing extensions first. I started modelling from a highly tessellated cylinder and worked from there. Once satisfied with the basic shape, I added a Lattice deformer (Animate> Create Deformers>Lattice), enabling me to easily add some slight curvature to the cylinder C.

Further refining

How to tackle the problem of pinching

04 Fill in the blanks

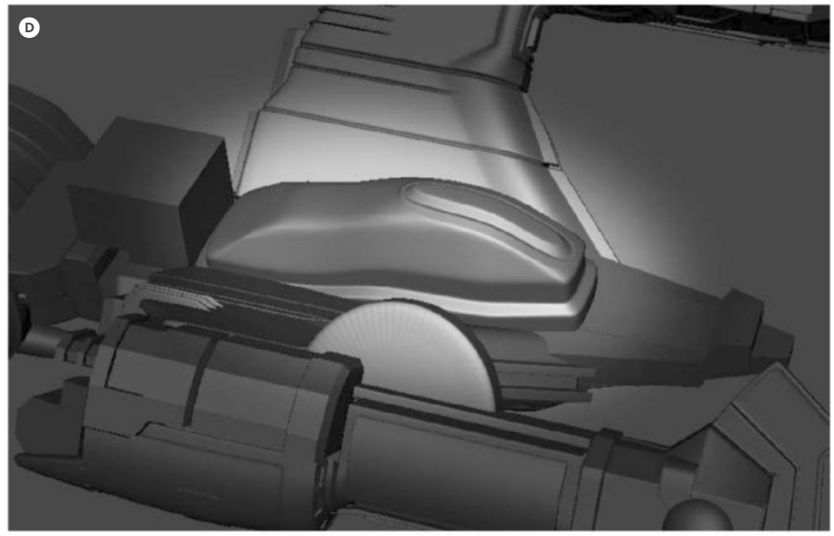
I was only provided with a three-quarter view of the ship, which means there were areas that weren't shown. As a result, I had to use my imagination to fill in some of the blanks. This is not always an easy task, and it means you really have to breathe in the feeling and design of the concept, to avoid having the freestyled parts pop out too much. The belly of the fuselage isn't really shown in the concept, so I decided to add some sort of sensor contraption. I blocked out a rough shape that I felt followed the general flow of the design D.

05 Planes and wings

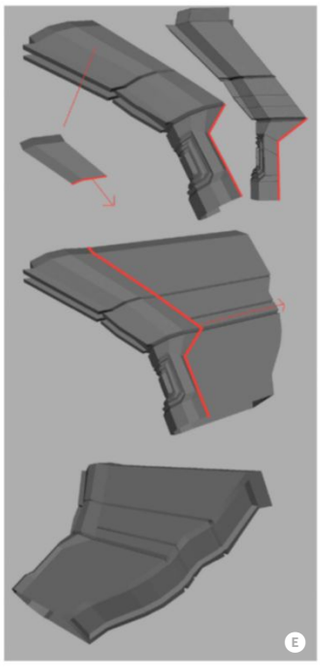
To model the wings I first started out by modelling the front part of them, which is sort of curved. I kicked off with a plane and extruded from the top of the wing to the bottom, where it meets the extension. One region that you should really watch out for is the area I've marked red in the screengrab; having proper topology here is essential. Once the shape is done, grab the edge marked with red and extrude outwards. Make sure it lines up with the general shape of the ship. The back of the wings isn't shown at all in the concept, so I simply made a space there that I could fill with various engine elements E.

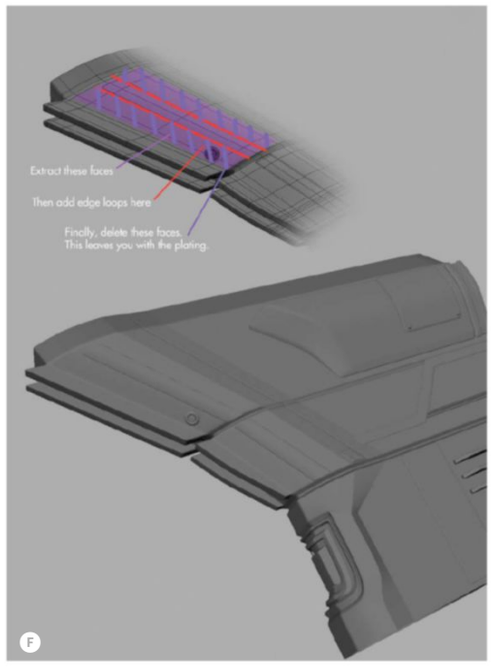
06 Wing panels

When adding panels and plating to a model, I have a trick that usually works really well: I duplicate the object that I want to add plating to, and then select appropriate faces that I want to use as plating. Next I press Shift and select the entire object, leaving me with everything selected except for the faces that I will use. After that I hit Delete and now I can tweak those faces to my heart's content and then extrude F.



> I was only provided with a three-quarter view of the ship, which means there were areas that weren't shown. As a result, I had to use my imagination to fill in some of the blanks. This is not always an easy task... you really have to breathe in the concept



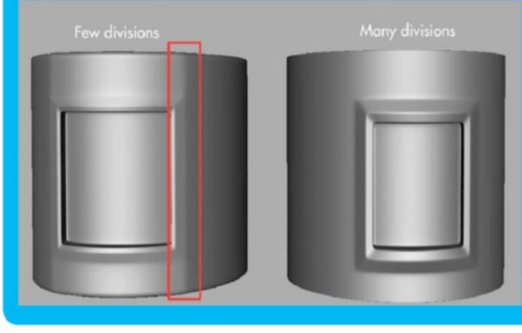


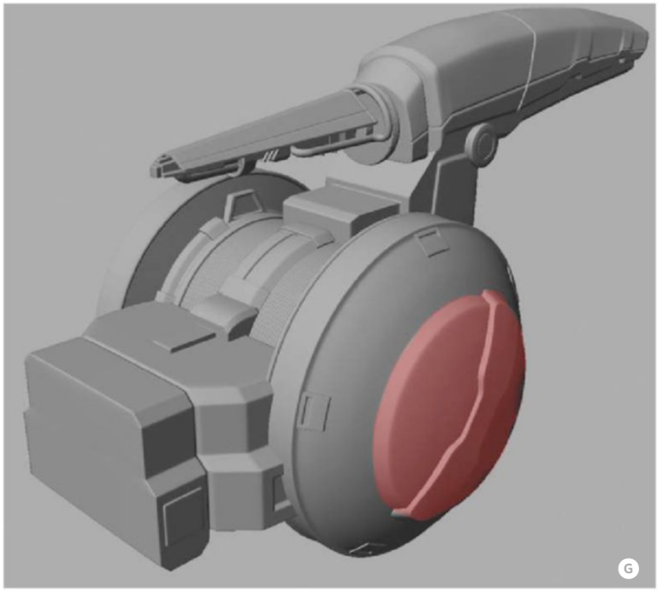
Problems & solutions

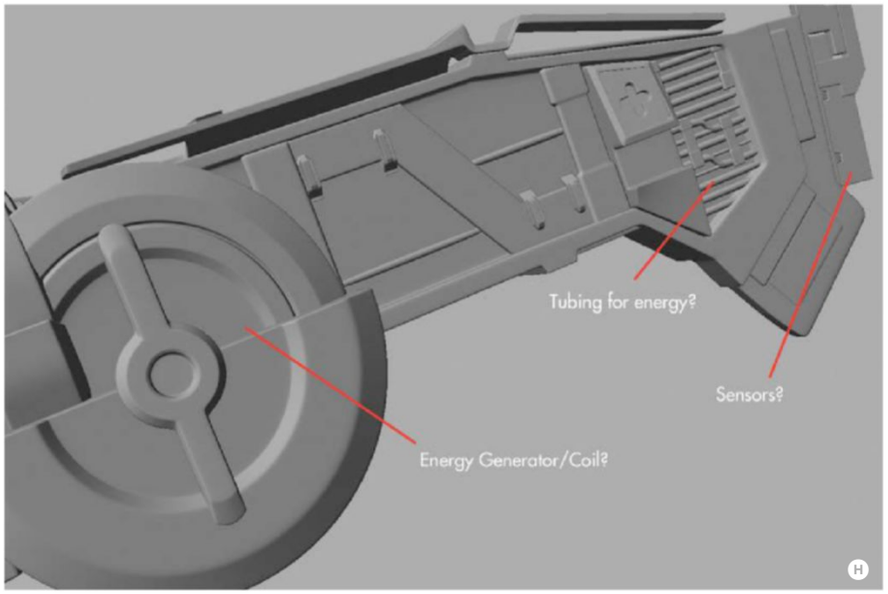
A frequent problem I had when I started modelling high-poly models a few years ago was pinching, especially on curved surfaces such as cylinders and spheres. Let's say I wanted to create a sphere with some plating on it; I selected the faces I wanted to extrude and started adding supporting edges to them, but once I previewed the smoothing (just press '3' to do this), I often noticed pinching around the corners.

In order to avoid this, kick off with a lot more divisions. This makes modelling a bit more difficult, seeing as you have a lot more components to work with, but the end result will be more than worth it. This also resolves the 'triangle pinching' on cylinder and sphere 'ends'.

When I'm making a cylinder that I know will have a lot of details and extrusions, I usually go with 40 or 80 divisions, depending on the complexity of the shape. Maya only allows you to go up to 50 divisions if you use the middle mouse slide in the Channel box, but you can type in another value manually by clicking in the field.





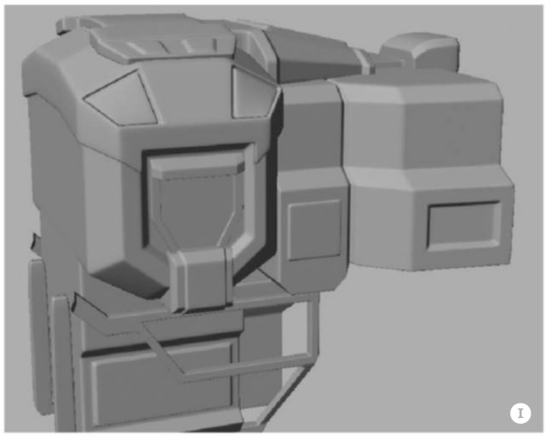


07 The big cylinder

The big cylinder in the middle of the ship is another of those areas that are kind of difficult to read. When I modelled this I was thinking that the engine and cannon were supposed to be able to rotate along an axis, so I made a lot of rivets and sliders to make it look functional in that aspect. To make the cylinder itself, I used a sphere that I split approximately three quarters of the way in. Then I scaled it to make the width look more in keeping with the concept. In order to easily select the faces in the middle to make the extrusion marked in the screenshot, I simply selected the centre vertex point, converted to face selection (Select>Convert Selection>To Faces) and expanded the selection (by pressing the '>' key) G.

08 Extension details

Now it was time to start adding more details to the ship. Since a lot of the details in the concept are blurry or hard to read I did my best to try and be a spaceship engineer. What were those extensions for? Were they sensors? Cannons? Tractor beams? I settled for sensors and started adding some electric wiring and plating there. I didn't want to overdo it, so I kept it fairly subtle – partly because that was the look I was going for with this model, and partly because I don't see why anyone would want a bunch of cables and fragile equipment exposed like that H.

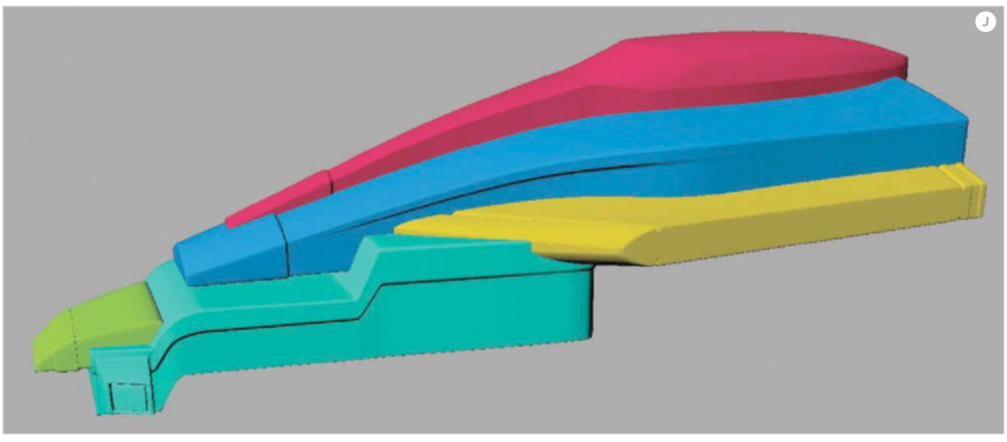


09 The 'waist'

I felt it was time to start working on the 'waist' of the ship. I really liked this part of the vehicle as it is so reminiscent of the real scorpions upon which it is based. I wanted to keep this part of the ship pretty clean, but still modular, so I used boxy shapes and added some basic plating to them. The most tricky part here was the cage at the bottom, but using a box and extruding can get you a long way. I simply made the basic shape that I wanted to cage in, and then used an extruded box to cage it in I.

Kill your darlings

Killing your darlings is a real cliché, but looking at work objectively and being ruthless can definitely improve your art. I found myself working on areas for a really long time to make them look 'right', but finally I decided to just delete them and remake them from scratch, keeping in mind my previous mistakes. Not only does this save you time in the long run, it usually ends up producing much better results. Don't be afraid to go back to a certain piece of the ship you're not happy with, hide it and start over. Then you can compare the new and old to see which piece looks best; more often than not, it'll be the new one!



10 Refine the fuselage

The fuselage was one of the most problematic areas for me when modelling this spaceship.

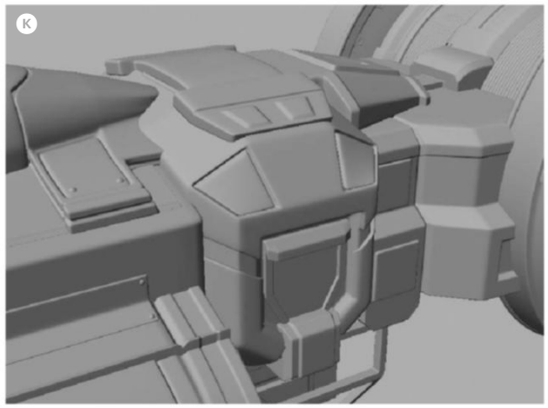
There were so many pieces overlapping each other and, at moments, I never thought I'd sort it out. But with some perseverance, I did! I used the aforementioned technique where I break up the area into segments and then tweaked and tweaked until it felt right. I've colour coded the segments for you in the screengrab so you can more easily see where the various pieces should go J.

The fine details

It's time to add the finishing touches

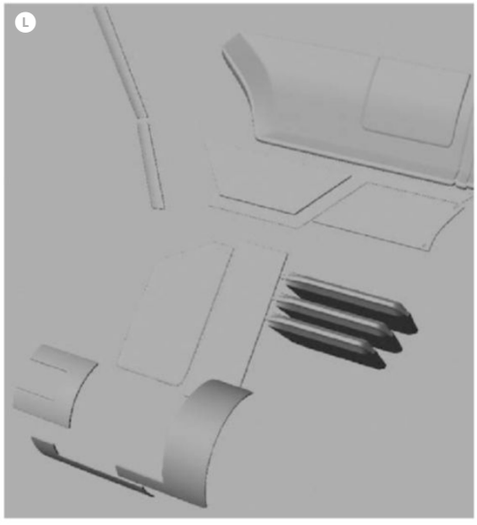
Less is more

It's really important not to overdo details! It's very easy to go overboard with details when working with sci-fi, and then you risk confusing the observer. Also think about where framing is necessary. Which areas are exposed, and which areas are prone to bump into things, etc?



11 Modularity

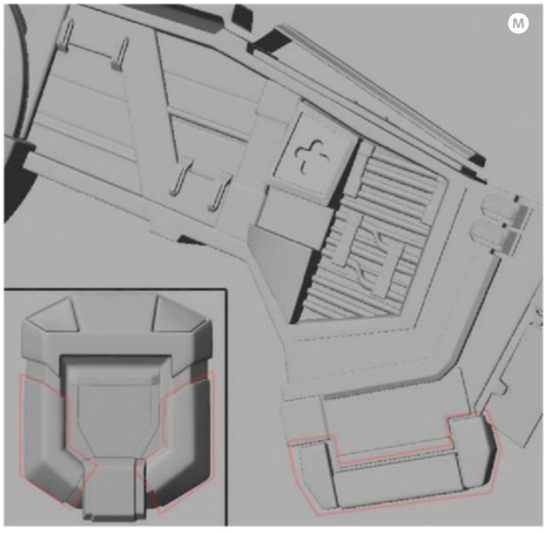
Using the same techniques from earlier steps, finish up the engine area and cannon at the back. Now that we've refined the ship's shapes it's time to add the final touches to the model. I am a huge fan of modular designs in sci-fi – those that look as if you can remove certain parts and replace them with others, changing its function or purpose entirely K.



12 Re-plate the wings

I really wasn't happy with how the wings looked; they were too clean and really not interesting enough. To make them pop a bit more, I added some subtle plating to them, by using the same technique as in Step 6. I didn't want them to grab too much attention from the 'main' plating that is coloured red in the concept, so I made the new plating follow their outlines and also made them thinner. Additionally I applied some plating to the 'cylinder' on the wing extension, using the same technique, but these ones are even thinner. I only wanted to hint at their existence L.

> Another idea I wanted to try to make the design more modular was to frame some areas to make it feel more reinforced and less exposed – partly from a functional standpoint and partly because I knew it would look better



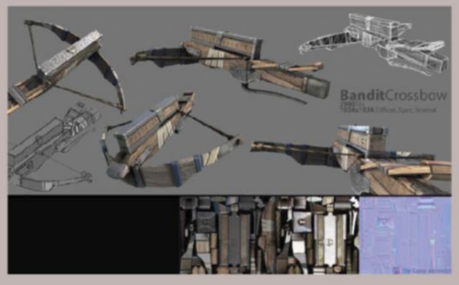
13 Framing and bolting

Another idea I wanted to try to make the design look a bit more modular was to frame some areas to make it feel more reinforced and less exposed – partly from a functional standpoint and partly because I knew it would look better. To frame things in, I simply used a cube and extruded along the edges of the object I wanted to frame. Once I was happy with the framing, I created a polygon sphere and placed it on hatches, plate edges and areas that looked as if they would be bolted on M.

Artist showcase

Wiktor Öhman

I'm a Swedish 3D artist who mainly focuses on hard-surface modelling and texturing. Although I am keen on moving more into concept artwork too.



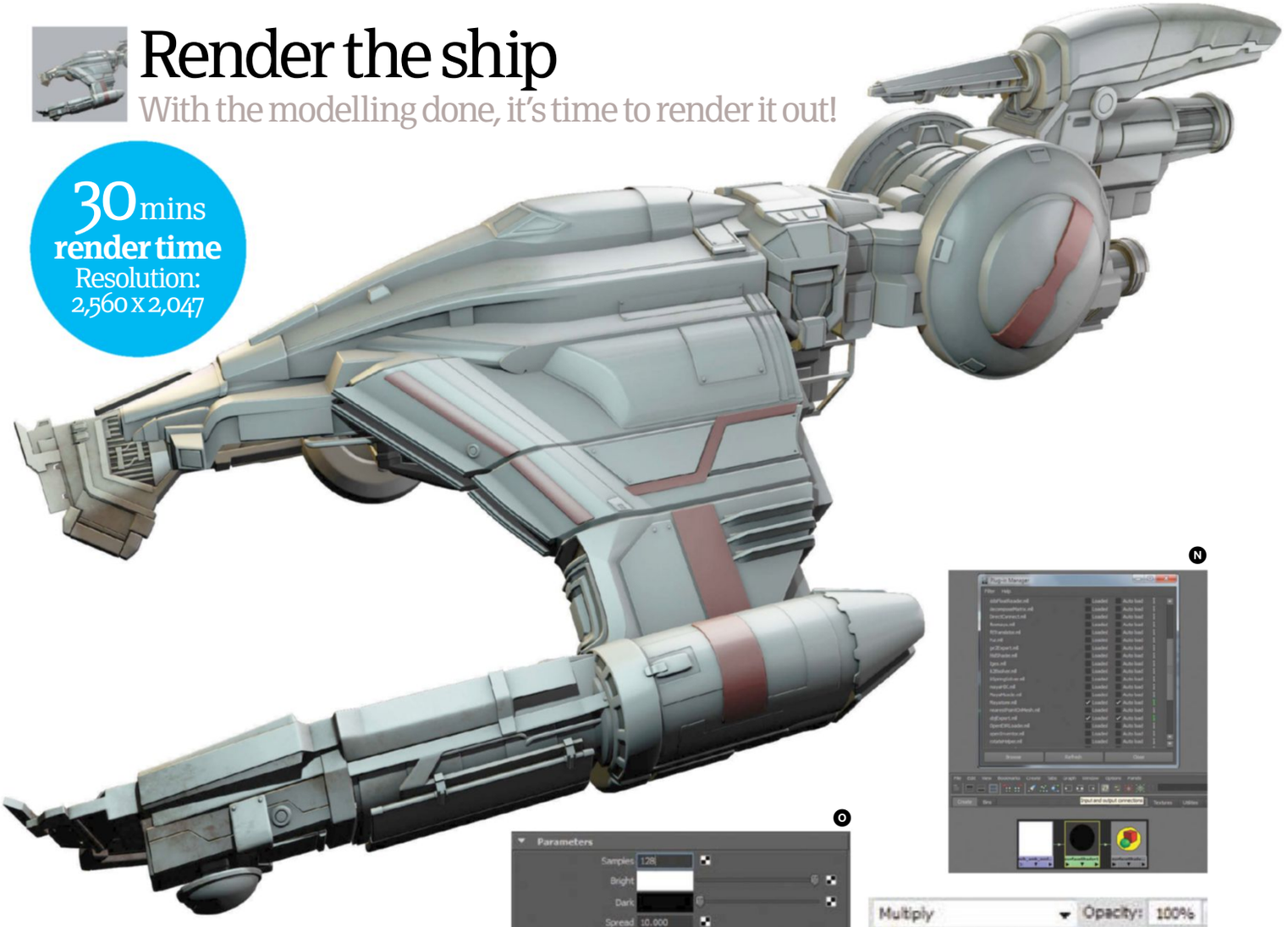
Bandit Crossbow **Maya, Photoshop, Marmoset Toolbag (2010)** I decided to make the crossbow a mishmash between a few different weapon designs, making it look like it has been put together by a bandit who has been plundering

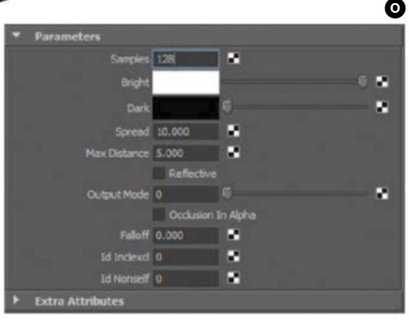
Heckler & Koch UMP45 **Maya, Photoshop, Marmoset Toolbag (2010)** This is a weapon I made to practise texturing a little while back. I chose this because it had a few really cool materials on it, eg some sort of plastic, bright metal and dark metal. It was a real challenge trying to define these diverse textures

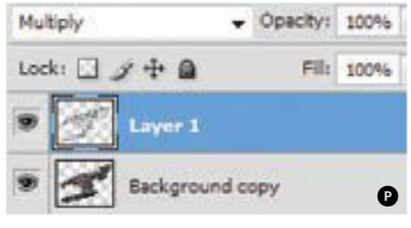
Render the ship

With the modelling done, it's time to render it out!

30 mins render time
Resolution: 2,560 x 2,047







14 Ambient Occlusion node

In order to render out ambient occlusion, we need to create a simple material. First of all, make sure that you have loaded the mental ray plug-in (Window>Settings/Preferences>Plug-in Manager) and then check the Load and Auto-Load option.

Now create a surface shader and click Input and Output Connections at the top of the Hypershade, before going to the mental ray section of the Hypershade and creating a mib_amb_occlusion node.

In order to connect this node to the surface shader, middle mouse click the right arrow on the AO node and release it on the left arrow on the surface shader. Select Default in the settings popup N.

15 Tweak the material

Now that we have our AO material, it's time to tweak it. Double-click the mib_amb_occlusion node to open it in the Attribute Editor. Usually I leave most of the settings at default, but there is one thing I always change: the Samples value. This basically sets the quality of our AO and I usually set this to 128 O.

16 Rendering

Now that we have set up the quality, it's time to render. Assign the surface shader to your model by selecting it then holding down the right mouse button on the surface shader. Select Assign Material to Selection. Now go to the render settings and make sure mental ray is the current renderer; then go into the Quality tab and set it to Production. There are a lot of tweaks that you can do here, but default Production usually does the trick. Finally go into the Common tab and set the desired resolution.

17 Compositing

In order to get our ship presentable we need to render it out once more, but this time with a simple blinn on it. Set Reflectivity to 0 and lower the Specularity value a bit, then render it out. Bring both the blinn and AO versions of it into Photoshop and place the occlusion over the blinn layer. Set the blending mode to Multiply on the AO layer and play with the Levels (Cmd/Ctrl+L) so it pops. And you're done P!

Next up

In the second and final part of this tutorial, I'll go over the texturing and rendering of the Scorpio spaceship using some cool techniques. I'll explain how to define materials, render settings and how to make a great AO render. I'll also be considering how to present your final image.

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Wiktor Öhman

3DArtist online

Personal portfolio site http://wiktorohman.artworkfolio.com

Country Sweden

Software used Maya, Photoshop

Expertise Wiktor specialises in working with environments and hard-surface modelling, but is also keen on branching out into concept art and character design

Texturing the Scorpio

Scorpio Textured 2011

"Following on from the concept and modelling process explored in the previous tutorial, we will now see the Scorpio spaceship brought to life with realistic textures"

Wiktor Öhman is a 3D artist based in Malmö, Sweden

In this second and final instalment of this tutorial I'll be showing you how to texture a hard-surface model, using the Scorpio spaceship as an example.

With metal-heavy models such as this, it's vital to know how to apply those subtle differences to surfaces that make a uniform base material look varied and worn.

I'll go over how to define different materials, teach you how to work with Diffuse, Specular and Gloss maps, as well as how to optimise your workflow within Photoshop.

Another aspect that I will be covering is how to apply stock photography subtly to really make the most of your 3D model renders.

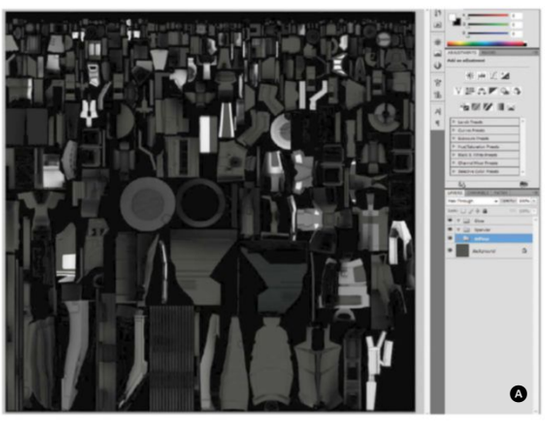
I see many a model out there where it is all too apparent that the texture artist has just taken a photo of a metal surface and plonked it onto the model, without taking the time to finesse and ensure that the join is seamless. By the end of this six-page guide, you should have striking but realistic hard-surface modelling nailed.

Get the base down

Set the stage with an Occlusion map

01 Structure your Photoshop document

The first thing I do when I'm about to start texturing is to set up my document properly. This will always depend on the sort of texture job that you're working on. For this texture I decided to create three different groups called: 'Diffuse', 'Specular' and 'Gloss'. These will be the three types of maps that we'll be using for this project A.



A

02 Add in the occlusion

Before opening Photoshop, I bake an Occlusion map using xNormal, which is a great free tool for baking a range of maps. It's basically as simple as uploading your low-poly and your high-poly models (in this case, the high-poly works as the low-poly as well) and then hitting Bake after selecting the type of map you want to output.

Once the occlusion is baked, put it in your Diffuse group and set the blending mode to Multiply. This is mainly to provide us with a visual guide when we're texturing. As a final step before rendering it out, this layer can be hidden and, instead of having the occlusion in the texture, you can render out a separate Occlusion pass B.

B

Texturing
Lighting
Rendering

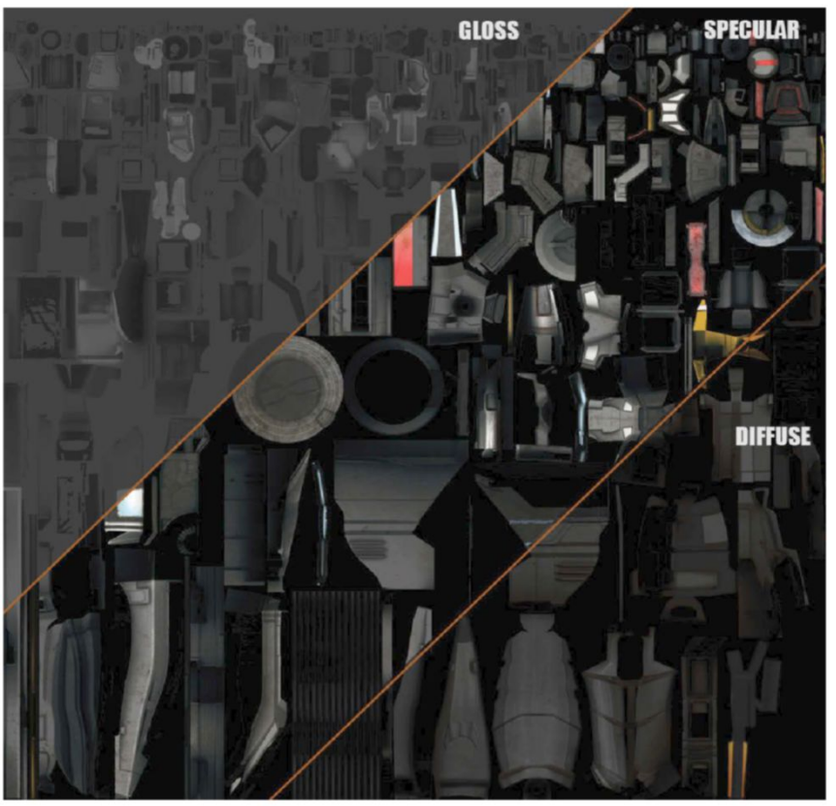
Software used in this piece

Maya Photoshop

C

03 Final occlusion touchups

Before we can start the actual texture work there is one more thing we need to do. In your Occlusion map, go into the Channels palette and then map your selection. Go back to the Layers palette and create a new layer above the occlusion layer, naming it something along the lines of 'Occlusion touchup'. Invert your selection (Cmd/Ctrl+I) and fill it with black; this is to hide any areas outside your UV shells C.



Iterations & organisation

When texturing there is a lot of going back and forth, at least for me. Nailing base colours at the first attempt can be difficult, so it's important to keep the base colour layers organised so that you can easily change them later on. It's always a good idea to have your Photoshop documents organised, but that's easier said than done. After 100 layers you can run out of relevant names to use!

In each base colour layer you can have slight hue and brightness variations, but – for example – try to keep blue and red colours separated. Again, this is for your own sanity. Going back to find that tiny yellow detail you know you added a day ago can be a real pain when you have 100 layers to toggle on and off to locate it.

Try to find a naming convention that works for you. I generally name my layers by the colours, materials and location of the contents, but each artist has their own preferences.

Further refining

It's time to get dirty...

04 The absolute base

For the absolute base shade that I wanted to use as an overall colour when working on this ship, I chose a dark grey tone – '#50504d' to be precise. This changed a lot during my work on this project, but generally when working on metal objects I start out with a dark grey like this D.

05 Slight variations

Next I wanted to start blocking out the darker and brighter areas. I put these areas on a separate layer to make it easier to make selections later on. If you want you can attach a Brightness/Contrast adjustment layer to this layer in order to make non-destructive amendments E.

06 Add some colours

Looking at the concept, there are only two main colours except for the green lights located on the tail.

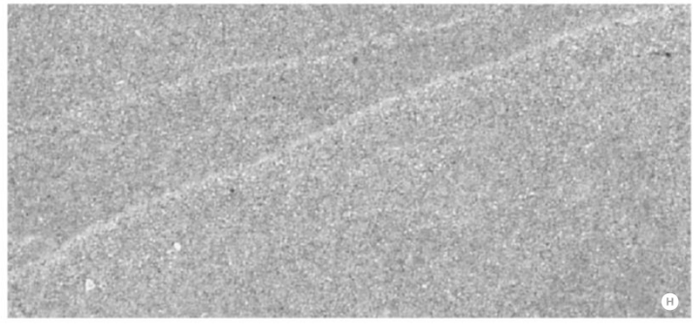
Getting the exact values from the concept could be as easy as colour picking, but we have to keep in mind that some of the colours might come from the specularity, depending on the material. I decided to simply guess the colours for now ('#6f2f22' for the red and '#ff9600' for the yellow) F.

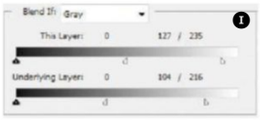
07 Get dirty

To add some quick dirt to the spaceship I duplicated the occlusion layer and tinted it to a rusty orange shade. I also switched the blending mode from Multiply to Normal. We're already seeing results here, but we need some more grain and irregularities to it. One way of doing this would be to mask it with a Noise filter, but I find that this usually makes it too artificial, so I take an alternative route G.

08 Mask the dirt

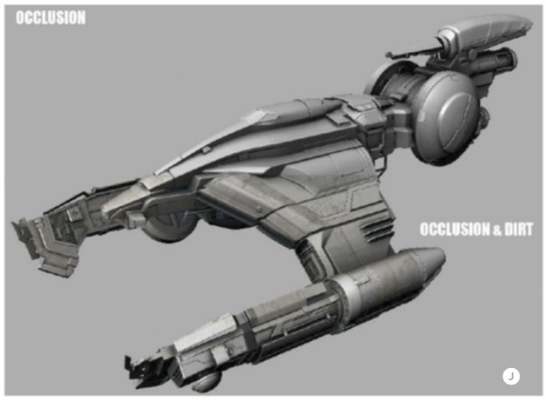
Instead of using a Noise filter, I used a photo with a lot of high-frequency details, such as a shot of sand. Once I'd found a photo I was happy with, I tiled it a few times and pasted it in a mask of the dirt layer; do this by Opt/Alt-clicking the mask. You should now see some grain in your occlusion, but we're not done yet! We now need to limit the dirt to areas that are more prone to getting messy to boost believability H.





09 Blend the dirt

For blending, we need to access the Layer Style menu. Double-click the layer and, at the bottom of the dialog, you should see two sliders. Opt/Alt-click in these to get a secondary slider. Make sure you have Preview checked and drag these around until you get a good, believable result. Once satisfied with the finish, close the dialog. Usually some manual cleanup is required too; just grab the Eraser tool and start removing any areas you're not happy with ❶.



10 Final dirty work

To add some interest to the base of the texture, we will now apply some extra dirt to limited areas. Choosing a photo of metal, increase the Contrast setting way up and set the blending mode to Soft Light at 10% Opacity. I really want to emphasise the importance of subtlety when texturing – especially when texturing objects that aren't overly worn and torn. The reason I added this layer was to add a bit more structure to the base material, rather than to emphasise scratches. Now we have a solid base for the Diffuse map. Bear in mind what I said about organising your layers and being subtle. Keep adding wear and tear until you feel the diffuse looks good ❷.

> To add some interest to the base of the texture, we will now apply some extra dirt to limited areas. Choosing a photo of metal, increase the Contrast setting way up and set blending to Soft Light

Study real-life materials

Something I've noticed in a lot of art is a lack of attention to materials. It really pays off to study materials in the real world. Pick up a ceramic cup and look at it in different light conditions to see how it reacts. Observe how tight the highlight is in various areas. Compare it to a cup with an alternative finish and consider the differences. Such scrutiny can really help you sell the believability of a model.

11 Specular maps

A Specular map dictates how light will react on different surfaces. When you create a default Blinn you'll get a solid colour as the specular controller. This isn't generally what you want; instead you want a map that varies it. The darker areas will be less specular, while the bright areas will have high specularity. Let me give you some examples. Rubber has specularity, but not much, so what you want for this material is a brighter diffuse and darker specular. Chrome, on the other hand, has a metallic finish that has a high specularity, so this calls for a dark diffuse and very bright Specular map. Many people use a bright Diffuse map when making metal, because metal generally looks shiny, but this isn't how this material works. Metal is generally dark, but the specularity makes it look bright. So Specular maps dictate the specularity, but then you have gloss ❸...

Artist showcase

Wiktor Öhman

I'm a Swedish 3D artist who mainly focuses on hard-surface modelling and texturing.

AK 47 **Maya, Photoshop, Marmoset Toolbag (2010)**
This must be one of the most commonly modelled weapons out there, and that's exactly why I made one: to see how I could hold up against other artists

Revolver Sniper Rifle **Maya, Photoshop (2009)**
I found a really cool concept by Michael Kingery (www.**michaelkingery.com**) that I felt I just had to model. It's really not practical, seeing as the fumes from the chamber would burst right into the shooter's face, but I still like it

Bird of Prey **Maya, Photoshop (2010)**
One of my assignments while studying was to make a character with only a Diffuse map under 9K triangles, based on a concept we made ourselves

Material matters

Apply the right maps to the right areas

12 Gloss maps

In order to really define the materials, we need a Gloss map. A Gloss map's job is more or less to dictate how tight the specular highlights will be. Dark areas will tend to have a wide highlight, while bright areas will tend to have a tight highlight. Using Gloss and Specular maps can be a very efficient way to define materials, seeing as materials have many more attributes than just colour and shading. There are even more attributes you can consider – such as reflectivity and translucency, etc – but to keep things simple, we will leave it at those on this occasion L.

> A Gloss map's job is more or less to dictate how tight the specular highlights will be. Dark areas will tend to have a wide highlight, while bright areas will tend to have a tight highlight

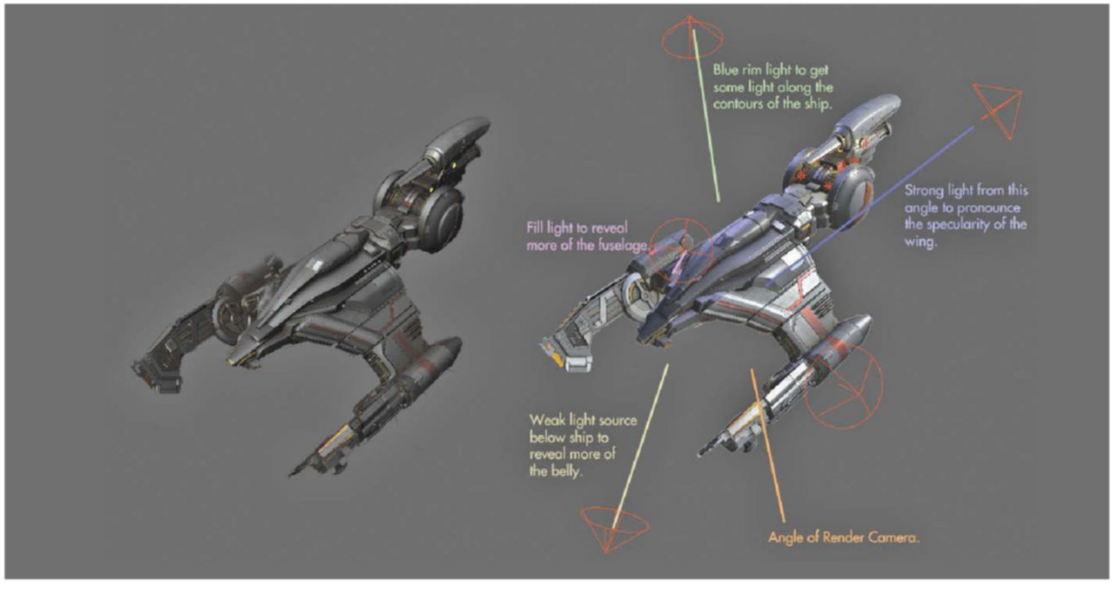
13 Identify the materials

The most crucial part of this step is identifying the different materials and understanding how they react in real life. The way I read the concept was that most of it consists of painted or treated metal: chrome, yellow-painted metal and red-painted metal. I also had to figure out how these surfaces would look if they were scratched or dirty.

The painted metal would be fairly specular, but I wanted some slight variations on the plating on the wings and some other areas, just to make it look a bit more interesting. I decided to keep the yellow parts quite flat and gave the red parts more zing. Of course, the chrome areas would be highly specular M.

Tie it all together

It's time to composite all the elements



14 Set up the lights

When I was setting up the lighting for this model, I really wanted to accentuate the specularity of the wing, making the wing and the fuselage the focus of the render. So I created a strong Spot light and placed it at an angle about 120 degrees from the camera; this would create some interesting highlights. Experiment with angle and camera position until you're happy with the look.

15 Rim light

A Rim light is used to distinguish the model from the background and to highlight the outline of the model. I decided to give this light a pale blue hue as I wanted to give it a bit of a futuristic feel to complement the subject matter N.

16 Tail lights

To add some illumination to the glowing details on the tail, I created a Point light for each light source and then set the Decay Rate to Quadratic and the Intensity to around 20; I didn't want them to be too strong. The light for the green glowing details was slightly more intense. After these were in place I added some subtle Fill lights around the scene for the areas I wanted to show off eg the belly of the ship O.

> To add some illumination to the glowing details on the tail, I created a Point light for each light source and then set the Decay Rate to Quadratic and the Intensity to around 20

17 Present the final render

When you're done with the texturing, and feel it's presentable, render it out at a high resolution – such as 2,048 or 4,096 – and at Production quality in Maya. The reason I chose to render it out at these values is because I like to work at a higher resolution and then downsize the final result.

Take the render into Photoshop, and remove the background by selecting the Alpha channel and inverting the selection (Cmd/Ctrl+I). This will enable you to change the background to your liking. Play around with some adjustment layers to make it pop even more. Downsize, save it out and your spaceship is done P!

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Till Nowak
3DArtistOnline

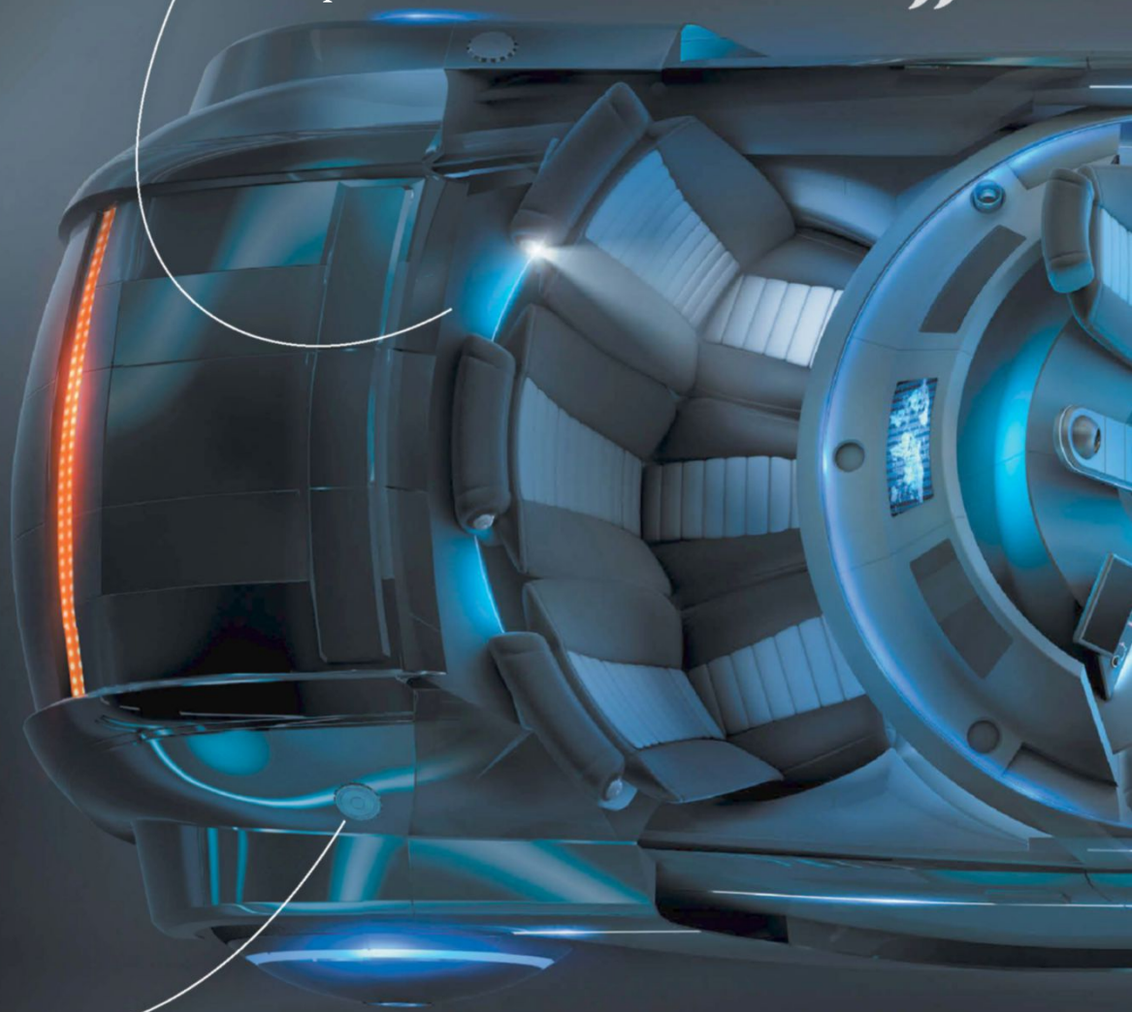
Website www.framebox.com
Country Germany
Software used 3ds Max, V-Ray, Photoshop

Software used in this piece

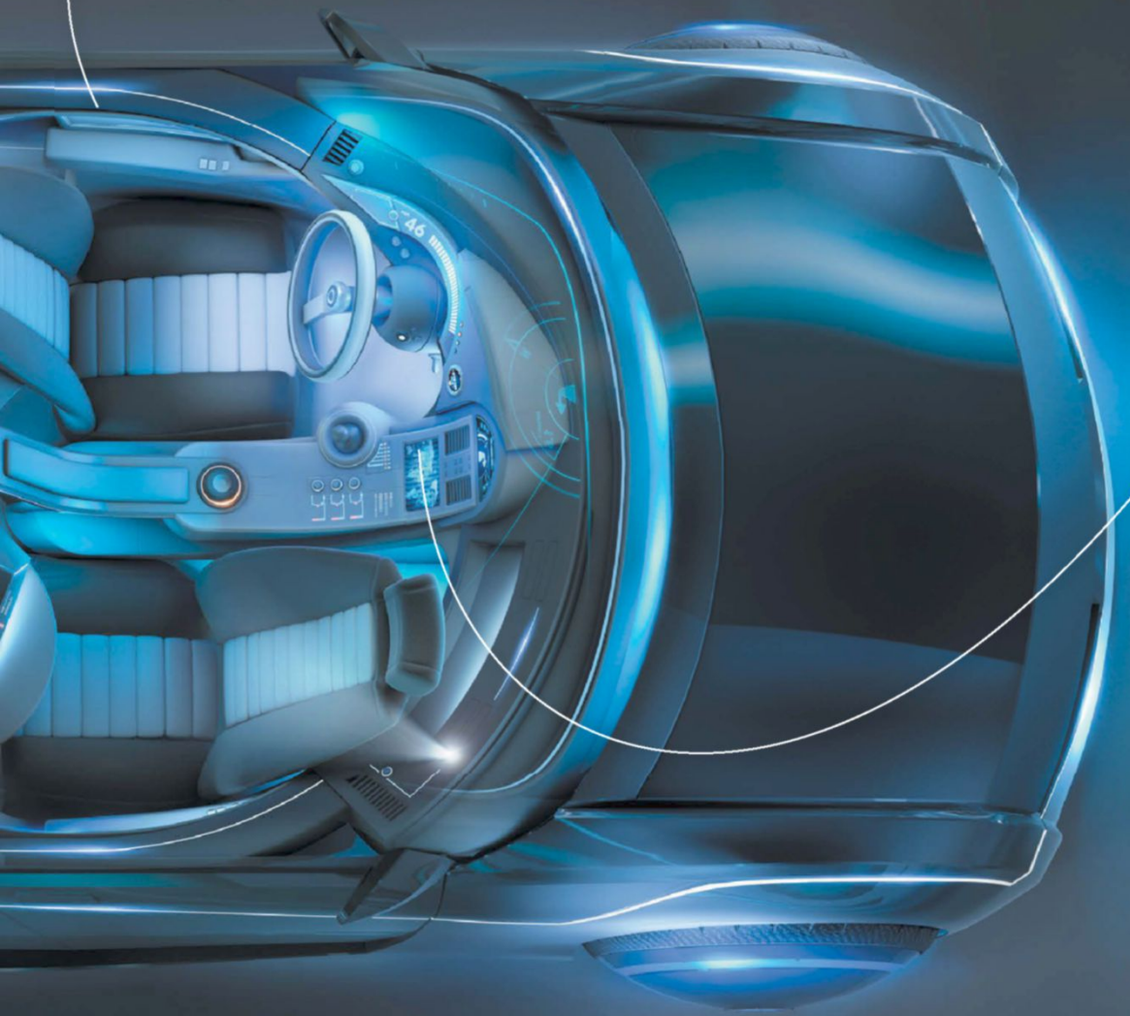
3ds Max | V-Ray | Photoshop

> The images certainly contain traces of Syd Mead and *Tron*. I've always adored the strong, basic geometric shapes in Syd Mead's work, which I tried to incorporate here with the circular element

> For each image I rendered a version with Global Illumination and one without. I later blended the two images in Photoshop. This was helpful because, in some areas, the feeling of bright light shining out of the darkness can be achieved better by carefully blending in some of the more contrasted version without GI, while the full GI version was a little too soft in other areas



“The glowing lines are not only related to *Tron*; I see them as a whole genre of style developed in the Eighties, when mankind discovered that it – more than ever – liked glowing things! My client for this job is actually the manufacturer of glowing light lines in the real world, so they have a practical purpose too”



“The central console rail in the front cockpit – where the controls of the car are located – has a slight subsurface scattering feel to it. I achieved this using an inverted VRayDirt map. By switching on the Invert normal checkbox in the map parameters, you can get a glow towards the outer (convex) edges of a volume, instead of the inner (concave) edges, as is normally the case with a dirt map”

Automotive design for SCHOTT AG 2010

This futuristic car environment was a commissioned job for the high-tech manufacturer SCHOTT AG to serve as a presentation area for its glass and lighting products. I used it as a chance to experiment with the one geometric shape that has always fascinated me: the circle.

Model a hot rod

Concept design
Modelling

29 Rat Rod Pickup 2011

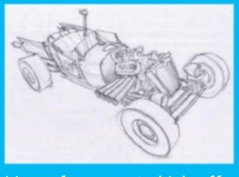
> Rat rods are the rebellious, low-budget alternative to traditional hot rod building. These roadsters are pieced together from junk yards, swap meets and any other resource of decaying automotive offal

Alex Villarreal Freelance concept designer

Before starting a project like this it is best to know a little about the mechanics of automobiles. The fastest way to learn how a car works is to build a plastic model. You don't have to paint it or aspire to get your LOD to rival that of the real car; what is important here is to learn the basic workings of a car. Furthermore, if you are having difficulty in getting the major proportions correct you can scan in the side, front and back views on the instructions and trace them in 3D.

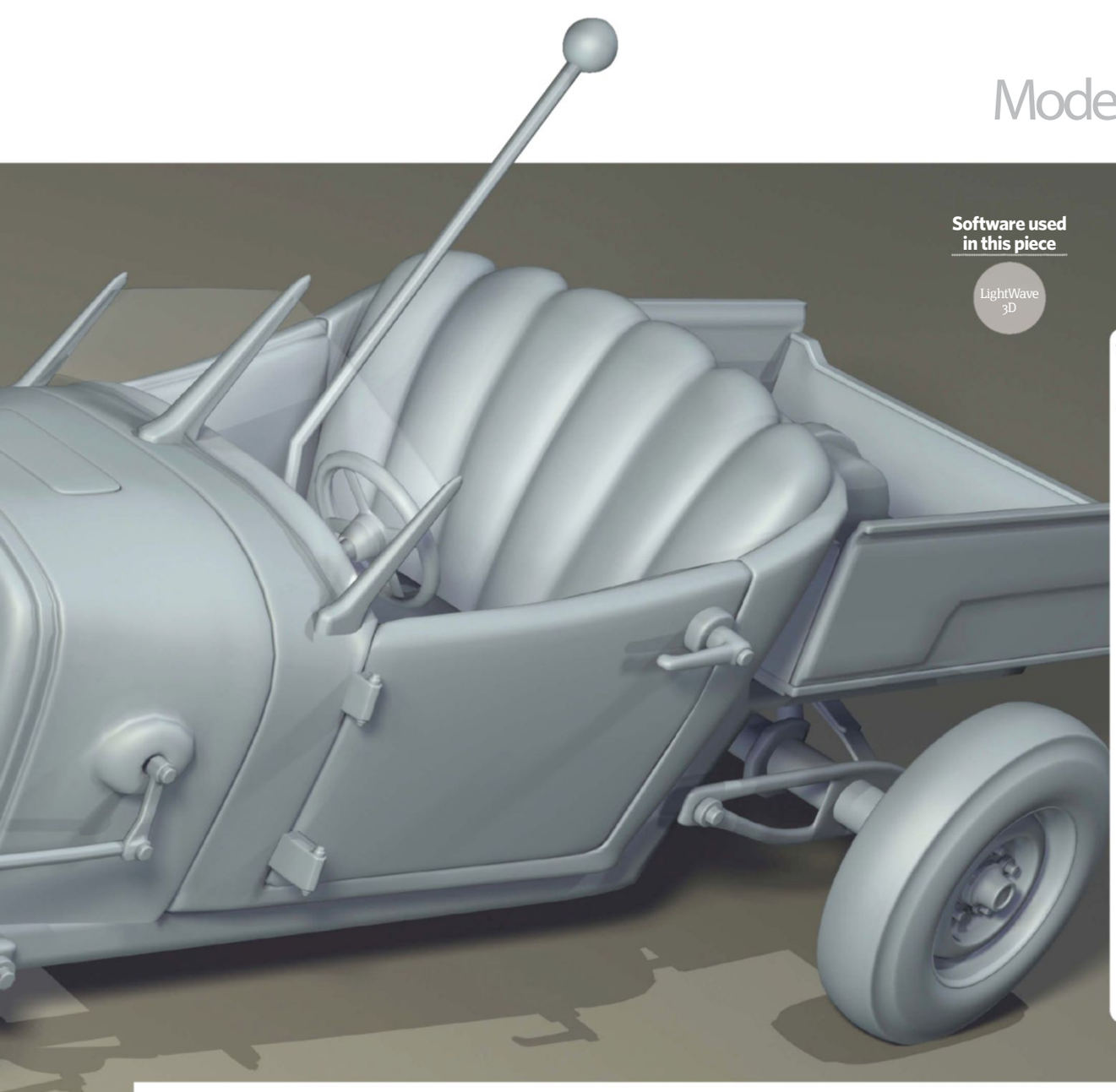
For photo reference go to car shows and take lots of pictures of mechanical parts, but the best resource for all things mechanical by far is restoration guide books. There are many processes for creating art but only a few ways to make something functional. I also recommend reading through this tutorial in its entirety before commencing to be fully aware of what to anticipate while in the initial stages. Remember to save in steps and save often as well!

Concept



Use references to kick-off ideas for your design. Search online to find entire builds from start to finish for technical and foundational knowledge. Observe the workflow and why certain decisions were made.

> Ask yourself who, what, when, why and where… The way you answer these will define the final design



Software used in this piece

LightWave 3D

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Alex Villarreal

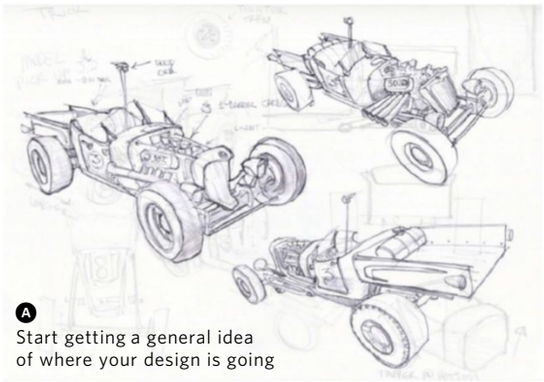
3DArtist online

Personal portfolio site
www.alex-villarreal.com

Country USA

Software used
LightWave 3D

Expertise Designing and modelling cars is what keeps me interested in 3D software. I particularly like the strange and abnormal show cars and rat rods. The more character a car has, the more I want to create it.



A Start getting a general idea of where your design is going

I treat my reference like a catalogue of parts to order for my car

B

3:38 hours render time
Resolution: 6,000 x 3,500

01 Define the design

Ask yourself who, what, when, why and where. The clearer you answer these questions the better your design will flow. For this tutorial the most important of these are who and what. The way you answer these questions will alter and define the final design. Think about the person who will drive it and how that affects the design as well.

Who is this model for?
- Film: high poly
- Game: low poly
- Concept: client idea based

02 Gathering and using references

Once you have defined a style and general idea of where you want to go, begin to gather reference material to help give credibility to your design. These images and models should inspire and fuel your imagination along the way. Pay special attention to the following areas:

Skeleton – Chassis (the way it distributes weight and dexterity)
Flesh – Panels (flow of light on form and texture)
Muscles - Mechanical aspects (suspension, brakes, steering)
Heart – Motor (power source and the transfer of it)
Brain – Cockpit (control point)

Problems & solutions

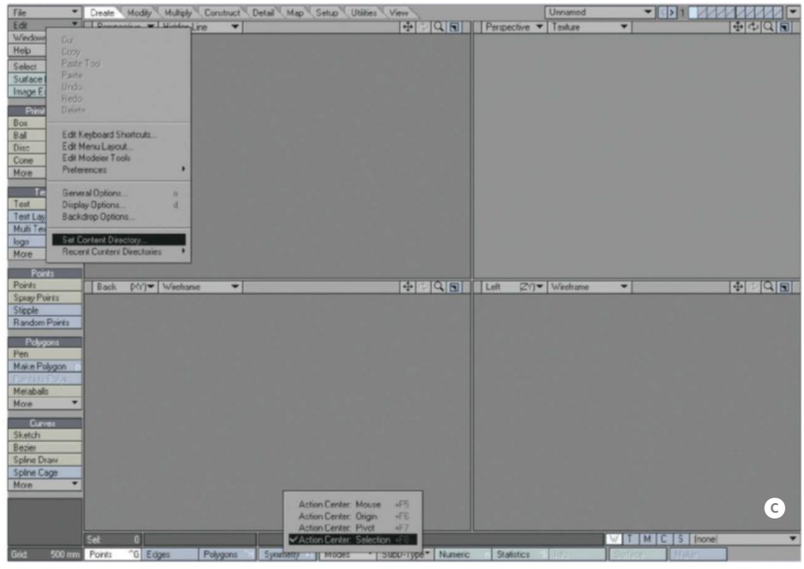
When modelling, I tend to work on everything generally rather than focus on one specific area at a time. I also have my reference pictures right in front of me as I work. When just starting out, the errors made usually deal with design rather than technique.

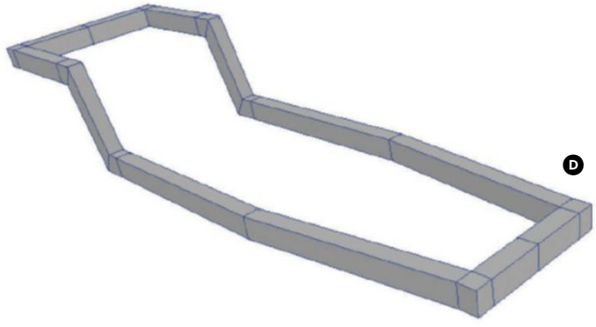
Sometimes I find that individual forms may not be working with the whole, in which case I will redo it using the same process. I think it is important to get in there and fix these errors and not just learn to avoid them. If you are not, you are not pushing your skills and not progressing. Learn as many design principles as you can to add to your toolbox. Also, remember that these tools not only build but fix the design.

Begin the design

Use your reference and preproduction notes

03 Begin work in Modeler Launch LightWave's Modeler. To use the plug-ins for this section click on the Edit button and find Set Content Directory. Once you have initialised this, find your program folder (C:\Program Files\NewTek\LightWave 3D\Programs) and click OK. This loads all the auxiliary filters and plug-ins that come with the software. As for tools, these are some of my most used ones include: Smooth-shift (extrude), Copy and Paste, Scale, Move (both geometry and view), Knife, Create poly, Weld and Mirror. Also, change the Action Center mode to Selection C.



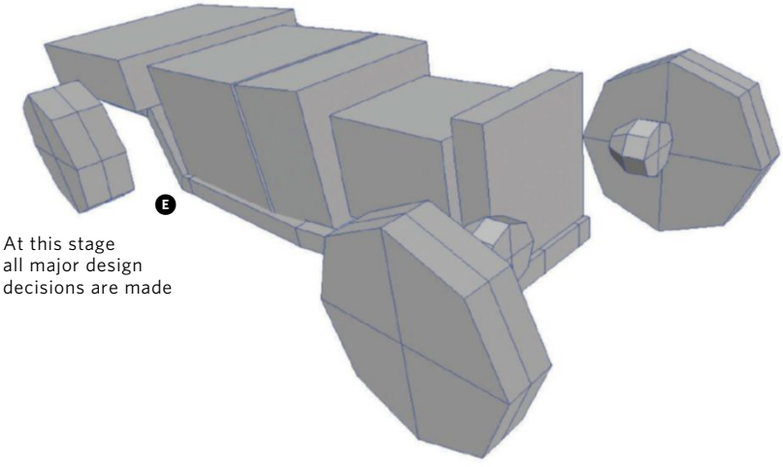


D This foundation element looks simple but, if not established properly, will cause problems later on

C Load plug-ins and learn shortcuts

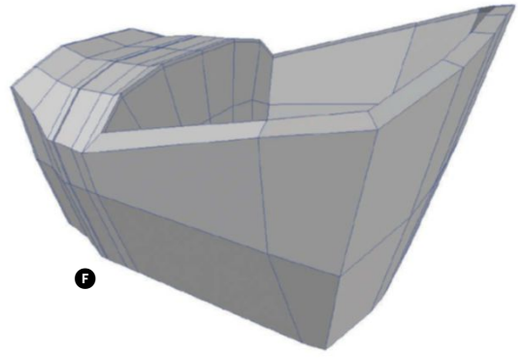
F Keep your polygons loosely defining the cab

04 Laying down the chassis The chassis defines the stance and distribution of weight. To make this frame have hard edges select the whole frame and set the Subpatch Weight to 89. This will allow a round yet firm edge all around when in Subpatch mode. Setting these weight maps along the way will help mould your model with limited additions to your poly count D.



E

At this stage all major design decisions are made



F

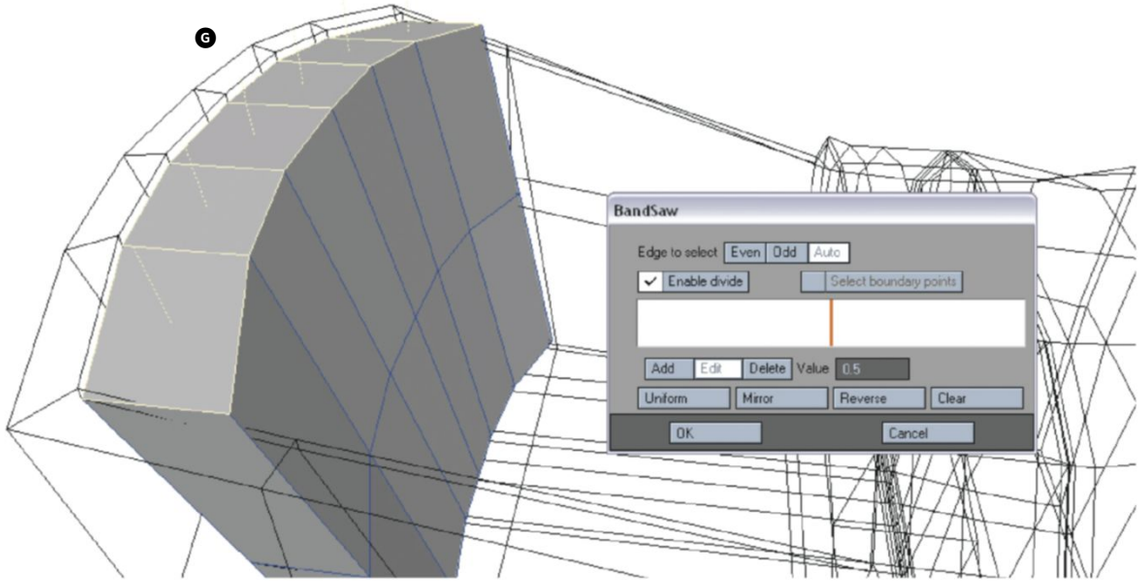
05 Blocking in Establish the key proportions for your major forms, then assemble the parts to get the desired ride height and stance. Block out these major forms on separate layers: one each for the cab and cowl, bed, engine and tyres.

In this step your model will really start to take shape. Once all major forms are blocked in you should be conceptually done – it is all details and refinement from this point on. To flesh out the design further you can take a few quick screenshots and draw over them digitally. Whichever you choose, make sure it is the way you feel most comfortable E.

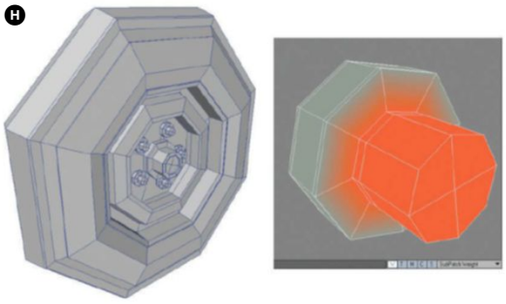
06 The cab Polygon flow is the most important factor when adding geometry to a simple form. I find that using mostly four-pointed polygons works best to keep that flow consistent. Be strategic and anticipate where you are going next. Keep in mind how the doors, interior and dashboard will flow into the main structure. Also be as economical as you can and only add sub-divisions when absolutely necessary. Remember that it is harder to take out geometry than add. Measure twice and hammer once F.

07 Interior Use the geometry defined by the cab as a base for all major interior elements. A base for the seat was made by extruding the rear portion of the inside cab. For adding more geometry the BandSaw tool was used for edge loops along a given path of polygons. You only need to select three or so polygons in the path and the tool will calculate the rest. Make sure the polygon normals are facing the same direction for this tool to work properly G.

G

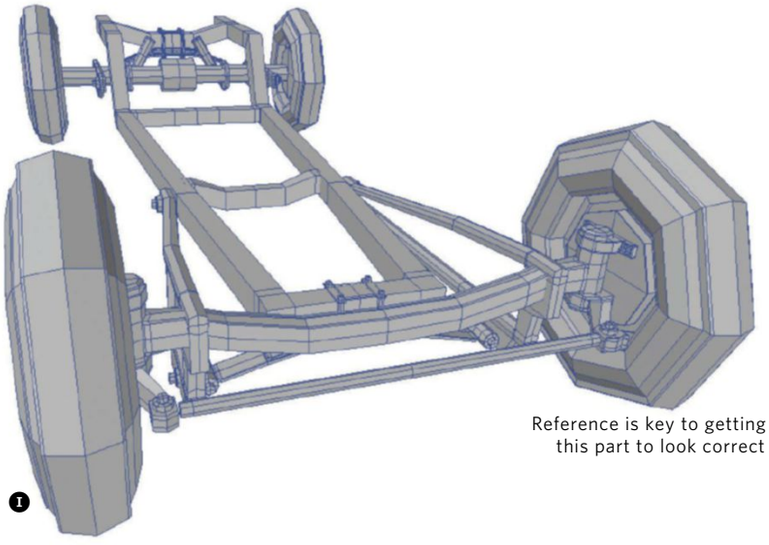


H



08 Wheels The wheels are made by extruding the left and right side geometry inward in a progression of scaling and moulding these polygons into a rim and tube. Copy and paste the central four polygons to make the base for the bolts then set the octagonal bolt to 89% Subpatch Weight map. You will be using this modular unit a lot H.

> When just starting out, the errors made usually deal with design rather than technique



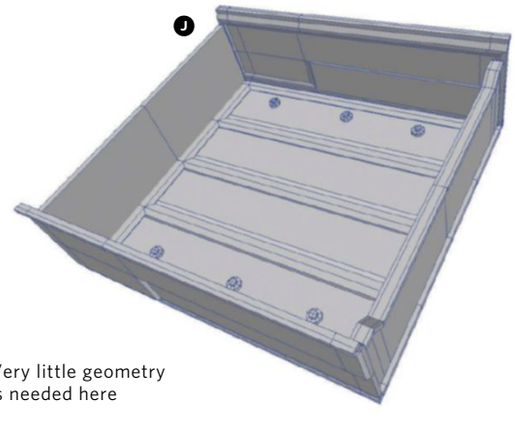
Reference is key to getting this part to look correct

I

09 Suspension For the suspension, scale down and stretch one wheel as a base axle. Using the wheel as the starting point keeps the axle centred, and this simple shape will help you visualise where your shocks and leaf springs will connect. Mirror over the suspension to the rear for a starting point to work off of. Although some of this work may not be seen, I like to model it anyway. It makes the vehicle feel more alive and that energy will transfer into other seen areas I.

10 The bed For the bed, scale down the base made in step 5 to make the bottom flat part, and bevel some panels accordingly. I copied the outer polygons on the top and extruded them to make the side panels. The bolts used here are from the tyres and are placed along where the chassis will connect J.

J



Very little geometry is needed here

Design questions

If you are having difficulties on the initial step of defining what your car will look like, start instead by defining what it is not. Both questions answered and questions asked are steps forward in your final design. Sometimes a wild idea will lead you to a more solid one that you would never have thought of, and those seemingly small progressions can lead to giant leaps. Do not limit your imagination in the first steps of designing. Purge your first ten or so bad ideas to get fresh new ones. Also, don't stop just because you can't get a particular area to work. Move on and come back to it later.

G The BandSaw tool enables you to modify the inserted edge loop's location and quantity

H Keep the wheel polygons governed by the four base hub polygons

The motor and wires

Move on to the more technical aspects

Artist showcase

Alex Villarreal

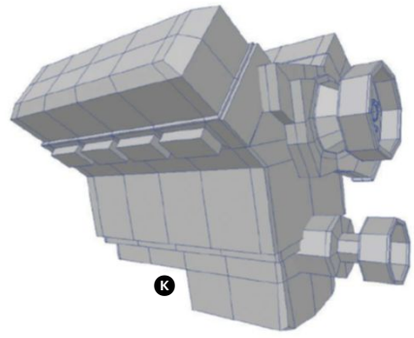
I have been drawing cars and aeroplanes since I was in elementary school. I later enrolled in a technical high school to learn about design and CAD-based technology. It was there I learned the fundamentals of 3D and really got comfortable using LightWave.

1939 USAF Issued Chevrolet Sedan LightWave 3D (2010)
On my wedding day we took lots of pictures with this car, and as a big fan of Glenn Miller it was only a matter of time before this one was modelled.

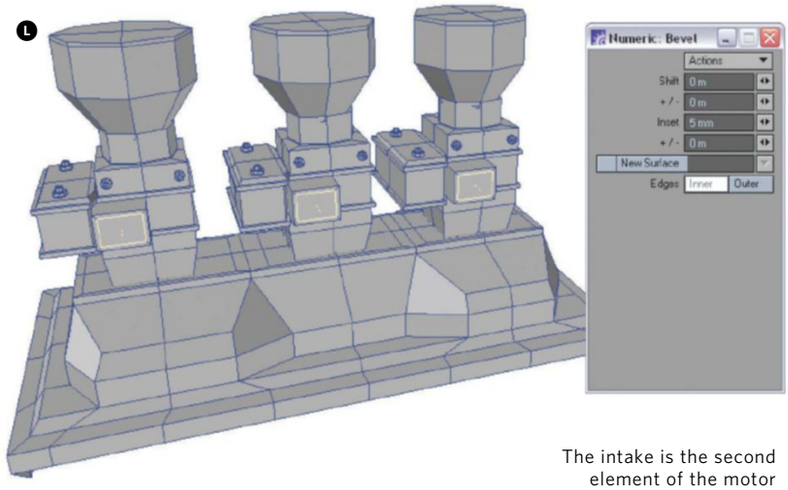
Secret Agent Hot Rod LightWave (2009)
This hot rod was created for an online challenge. I had just returned from a visit with my friend's hot rod shop and used a lot of the things I learned there in the making of this car.

The IB Special LightWave (2011)
After taking quite a few pictures of my friend's car I got to modelling it. I find that this is one of the best ways to learn how to model hot rods.

11 The engine block and heads The engine block is relatively consistent for all piston-driven cars with the exception of inline engines. Start out with a block that is slightly bevelled on the top, then extrude the upper left and right sides to make the heads. This parent shape must be correct so that the subsequent models will be. The cam shaft and crank shaft are scaled-down wheels moulded accordingly and the water pump was created using the front six polygons of the block K.



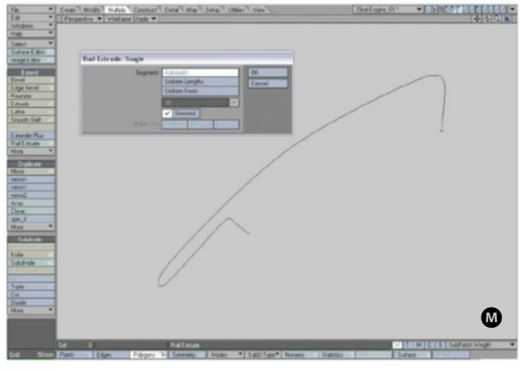
K



L

The intake is the second element of the motor

12 The engine intake manifold In order for the motor to have life it must be able to breathe. The intake manifold is like the lungs and there are many variations of this particular area. Use the top portion of the block for a starting base. For the carburettor and its air filter, start out with simple boxes and discs to find your proportions, and start to visualise how they integrate with the motor L.



M

13 Wires and hoses For making spark plug wires and other hoses, first I draw splines where they will go. The spline will generate the path for the polygons to extrude along using the Rail Extrude feature. I have a habit of doing this engine work in a separate file to better organise these details then replace the motor in the working file later on M.

Geometry in modelling

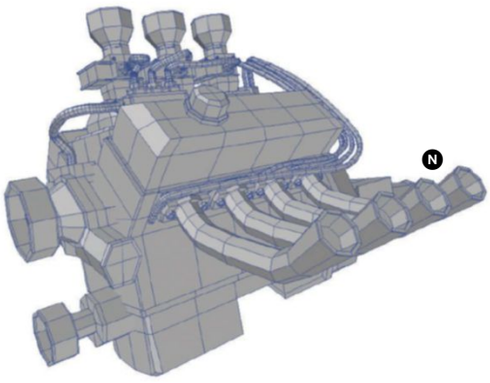
Place simple geometry first to help visualise your model. Trying to build a car around a steering wheel or another piece of detail will generally lead your focus away from the whole, causing your design to suffer. Zoom out and look at the whole object after each new element that you add.

K The engine block is the first of three elements to the motor

M Use Rail Extrude for hoses and wires

The last lap

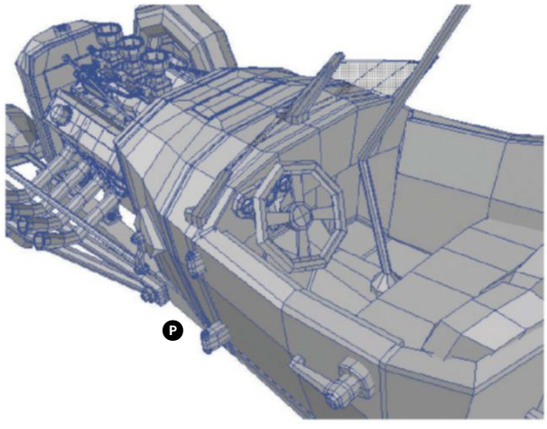
Finish with the interior details



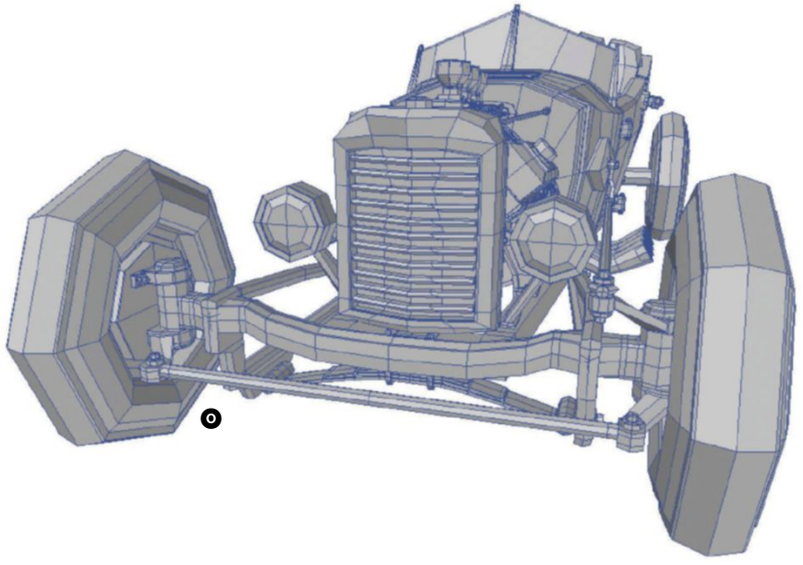
14 The exhaust system For the exhaust, start out with a flat, four-polygon disc, angled parallel to the heads and extruded in the front view port. I like to manually create these to better control the way it turns. After a good exhaust pipe is made, add connecting plates and bolts then copy and paste three more to mirror over to the other side. Also note that the edge around the end of the pipe has more geometry inside and out N.

Inspirational names

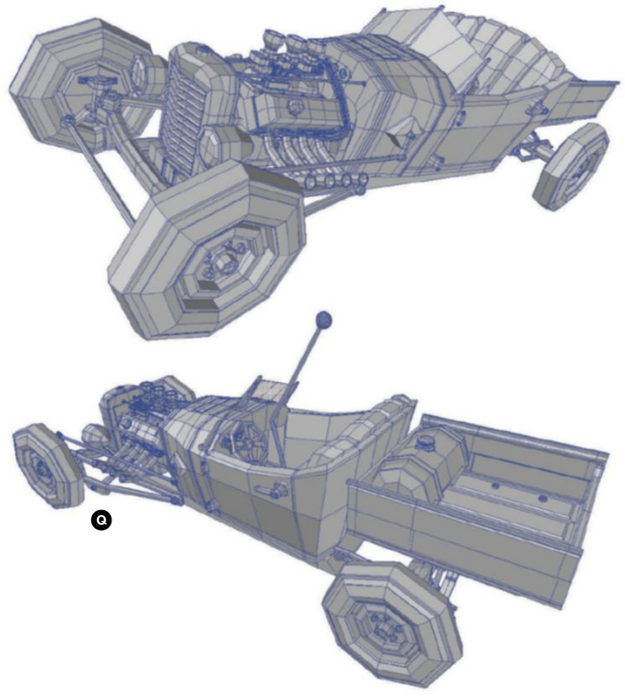
For interesting hot rod designs, look to what was being done in the Sixties. The greats of that time include; Ed 'Big Daddy' Roth, Kenneth 'Von Dutch' Howard, the Alexander Brothers, Larry Watson, Gene Winfield and George Barris to name a few. A lot of limitless experimentation was being done with designs and motors.



16 Interior details For the window, copy the two top centre polygons along the dashboard and extrude them. Copy and paste this pillar to the side and mirror it over. To create the shifter, copy one of the air intake pipes and rotate it upside down as a base. The steering wheel was made by copying the outer eight polygons of the wheels and extruding them out. Make it round by adding edge loops along the inner and outer side. Scale the inner loops in and the outer loops out. You will also need to copy and extrude the centre hub of the wheel for the horn area. Finally, move and rotate the steering wheel into position P.



15 Front details The next item to take care of is your steering, radiator, grill, lights and other miscellaneous details. Look at your reference to see how these parts connect and work together as a whole on the real thing. At this stage, start narrowing in on how this vehicle will function and what makes it unique. When creating the headlights, bevel out the front polygons to make the glass part then copy it. Select these four polygons and proceed to move them backwards and add more geometry to make the inside of the light. Paste the initial four polygons to get back the glass part O.



17 Final design Take a break and get your mind off of the model. When you come back to it you will see it with a fresh view point and see all the errors that you may have, over time, become accustomed to. Look over the truck and in your mind apply gravity to it. This will check to see if anything is floating in 3D space or if your vehicle is off balance. Tighten up any loose ends and make sure all parts are able to function cohesively too Q.

N The exhaust is the third and final element of the motor

O Front details

P Interior details

Q To be sure if a design is working see if it still looks right in the morning

Texture and light a hot rod

29 Rat Rod 2011

> The style of this truck will be a rusty pieced-together hot rod. Speed and attitude best describe this truck
>
> **Alex Villarreal** Freelance concept designer

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Alex Villarreal

3DArtist online

Personal portfolio site
www.alex-villarreal.com

Country USA

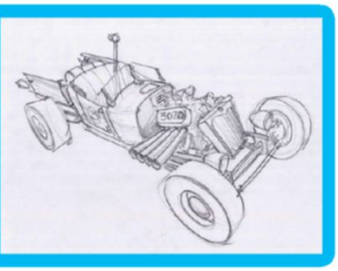
Software used
LightWave 3D

Expertise Hard surface modelling and design. I generally like to focus on cars and sci-fi models and am most interested in art and design before the 1960s.

This tutorial will cover the lighting and texturing approaches for a rat rod using LightWave 3D. I particularly like this genre of hot rods for its ability to express unique character and style while still retaining a given function. The way you light a model sets the mood and can also help to clarify forms and design. Texture is one of the powerful elements of a render, describing the history and character of the model. The way light flows over the form gives clues about its purpose, composition and strength. With the aid of textures you can also make a different, cleaner traditional-style hot rod version with relatively few modifications to the actual mesh. Use reference pictures to see how textures are in the real world and pay close attention to the subtleties that define character. It is important to simplify, especially at the beginning of the process. Build your model up in steps, one at a time, and avoid trying to do too many things at once. I recommend reading this tutorial in its entirety before commencing any work, to fully anticipate what will follow.

Concept

I will still be using my concept drawing and reference pictures to get a clear idea of what surface attributes and silhouette to achieve finally.



Texturing Lighting Rendering

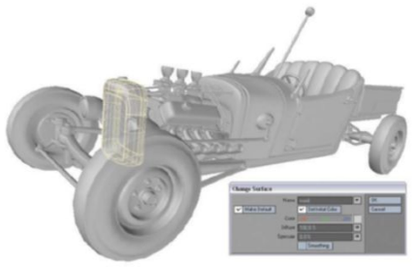
Software used in this piece

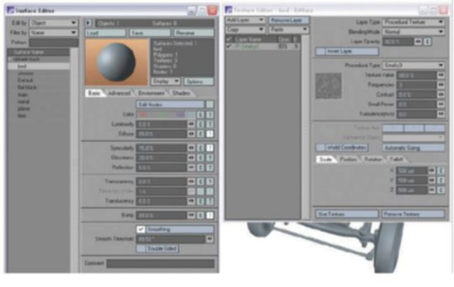
LightWave 3D

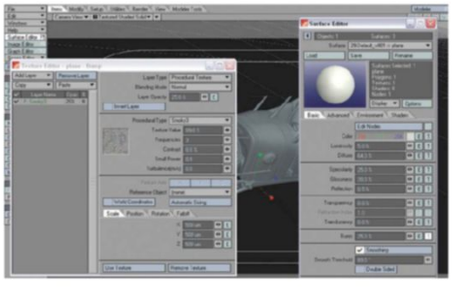
A Organise mesh by assigning surface names in Modeler

B Unify model surface attributes for test renders and create ground plane

C Load object into Layout, adjust ground plane and save scene







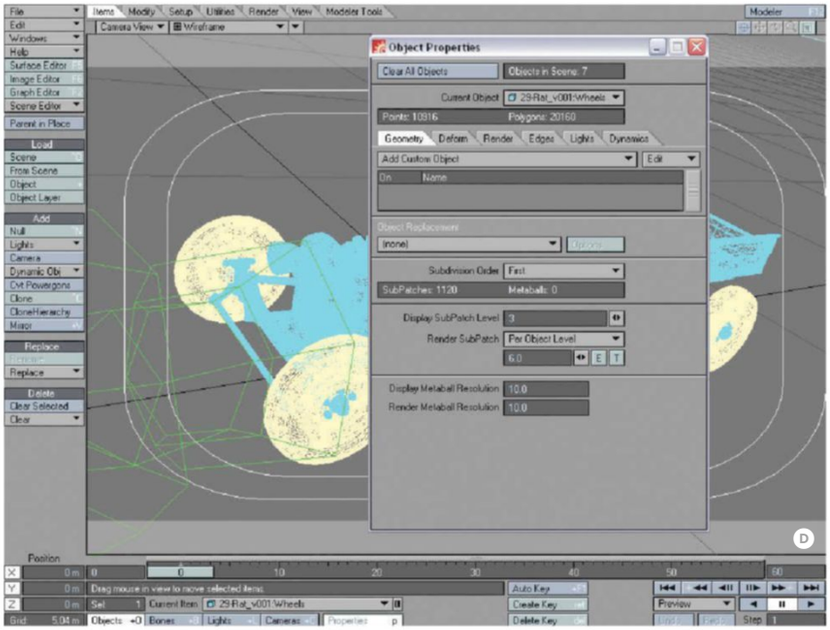
01 Setting surfaces in Modeler Begin selecting polygons and naming them using the Change Surface feature in Modeler. The major surfaces to create are a main surface, basic metal, chrome, and flat black. The main surface will affect the radiator cover, cowl, cab and bed. For now, consolidate the surfaces to help keep this simple. A great tool for keeping track of your surfaces and selections is the Statistics feature found on the lower mid section of the interface A.

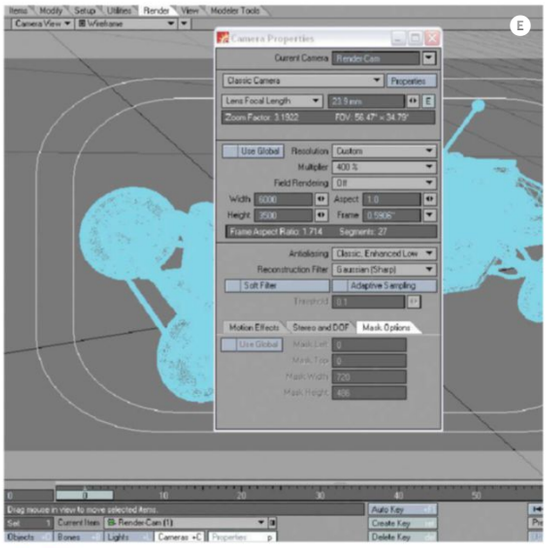
02 Set a default surface for test rendering Prepare your model for test rendering by assigning the same surface to all of the surfaces. For this basic surface, I added a little bump disturbance using the Smoky3 procedural map scaled down to 500 um on XYZ co-ordinates and used a similar effect on the diffuse and specular maps. Also, create a flat ground plane on a separate layer and name it accordingly in the layer properties and likewise with its surface B.

03 Moving into Layout Open Layout, load truck file and select layer with your ground plane. Scale it up in the X and Z co-ordinates until it reaches the horizon and set a key frame by pressing Enter twice. In the Surface Editor settings for the plane, set luminosity to 5% to simulate a slight bounced light effect. Save scene and ensure LightWave's Hub is communicating with both programs by checking that all modifications in Modeler are updated in Layout C.

Layout scene setup

Prepare your Layout scene for rendering





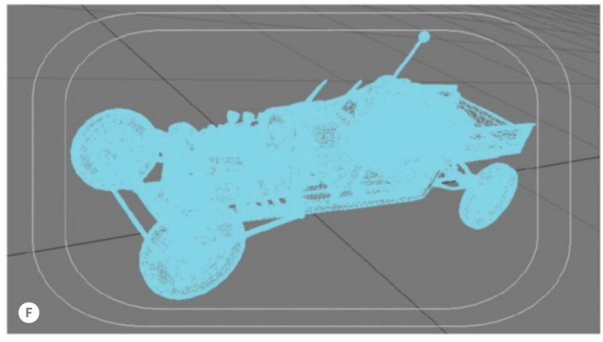
Problems and solutions

Some of the modelling and texturing will be difficult at first, but when you find something you like you can always plug it into a later model. That goes not just for polygons and textures but for ideas and techniques. When you work hard to learn something new, your few minutes spent struggling will result in a much longer time of good use. The longer you avoid a challenge, the longer you will not reap the benefits of overcoming it. Keep in mind that it is the challenges in the process that build your skills. One of the greatest challenges of these in the tutorial is defining a good rust texture. I used reference pictures and a lot of trial and error to find the right balance of chaos and order. The important thing to remember throughout this whole process is that there is no right or wrong way to go about it. This freedom could be both a good and bad thing, but in the end it allows you to create new things and is one of the reasons why I like design so much.

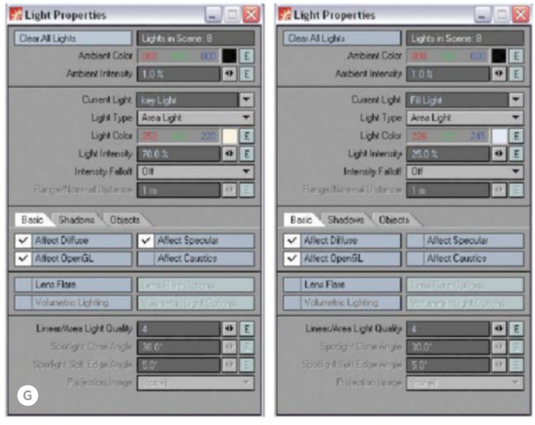
04 Increasing round-form geometry Select the layer containing the wheels and click Properties. In the Geometry tab, increase Render SubPatch Level to 6. This will give your tyres a rounder edge by interpolating more geometry and avoiding a choppy 3D geometric appearance. By placing other round objects in this layer, you can round out all the other remaining forms. This increases rendering time, so only add forms that have broad round edges **D**.

05 Camera setup Set up at least two different types of cameras in the scene. The first camera will be labelled Render-Cam. Set anti-aliasing to Enhanced Low and add a Gaussian sharpen filter. Change the resolution multiplier to 400% and plug in 6000 by 3500 for the height and width. You can use the multiplier to scale down the render for quick final render tests. The second camera is labelled Test-Cam and is by default set at low resolution with no anti-aliasing. This one is for quick test rendering of certain areas without changing the settings and location of camera for the final render **E**.

06 Choosing a composition To find a good composition, use the wireframe view to focus on the silhouette. Viewing the silhouette alone allows you to better frame your composition and find a pose that reads best. Next, do some test renders to make sure you are getting good light and shadows before you get too deep in surface attributes. Focus on the values first and the colours second. Adjust the camera for the correct composition with a wide angle or realistic lens, depending on your preference. Also, it is important to keep the aspect ratio at 1 to avoid an anamorphic frame render **F**.



07 Light setup Studio type lighting was used to achieve faster high-res renders. Rendering using radiosity will calculate bouncing light (with its colour) and will look more natural, but take considerably longer to render. You can reproduce these effects by strategically placing lights and thus reduce rendering time. Start by creating three lights and turning off the ambient light effects. Since there is little glass, caustics do not need to be enabled on all of them – to reduce rendering time **G**.



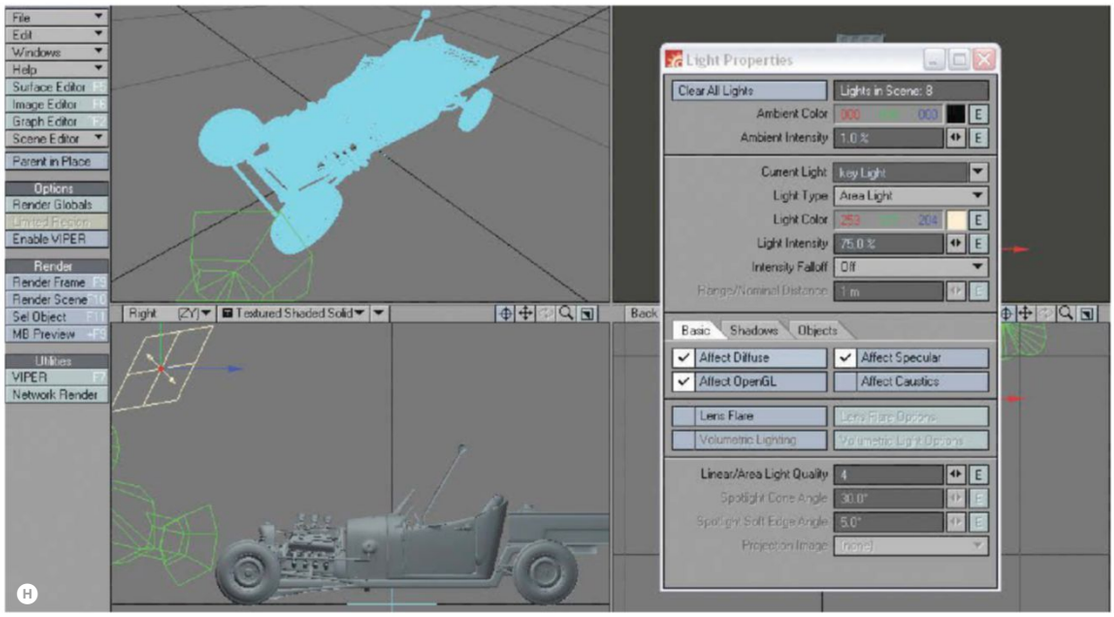
D Increase the SubPatch level for the wheels and other round objects

E Adjust the test and final render camera properties

F Composition and camera setup using wireframe view

G Area light setup for studio type settings

H Position/adjust Key, Fill, Top and Bounce light properties

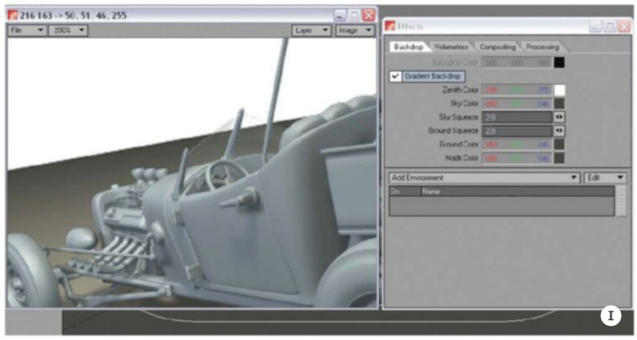


H

I Use a light-coloured gradient backdrop for extra lighting

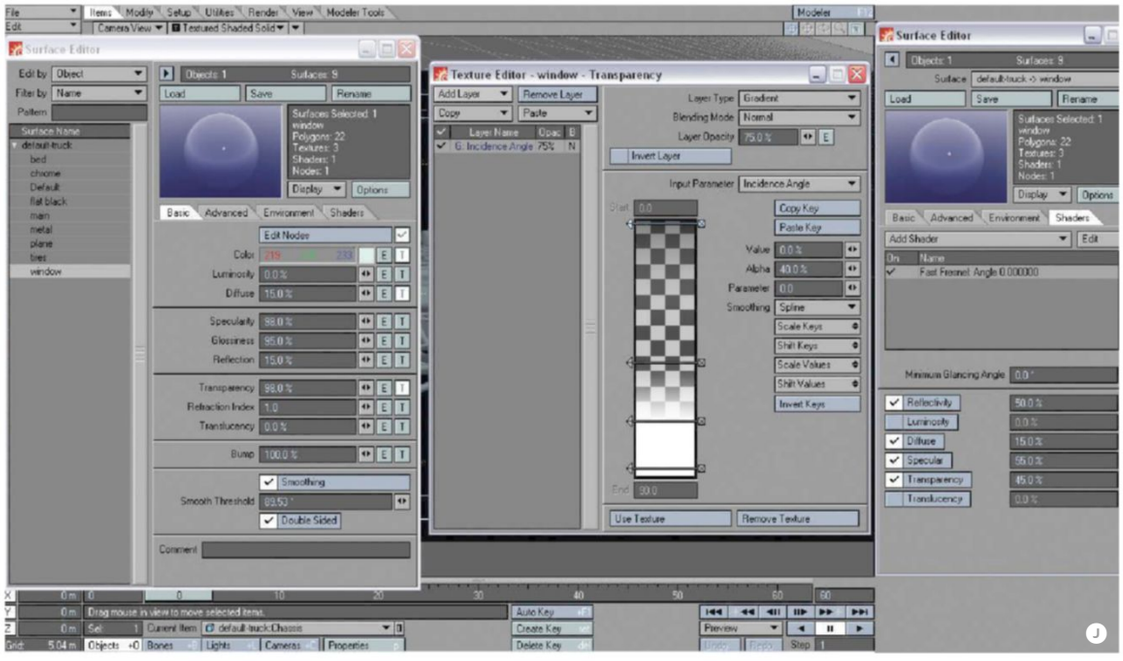
J Apply Fresnel effect to enhance the natural look of glass

08 Adjusting light properties I prefer using area lights exclusively, for their softer shadows and broad lighting. The main light or Key-light will be the hottest light, both in colour and luminosity, with a light red-orange colour and 75% intensity. The secondary light or Fill-light will be the coolest light at only 35% intensity and will act as a bounce light. Uncheck Affect Specular and change the colour of the light to a very light blue and shadows to a very dark blue. Finally, add a Top-light to ground the car with a nice shadow and a bottom bounce light underneath the ground plane H.



I

09 Applying a gradient backdrop The backdrop settings for your render play a role, even if it is not seen. Open the Backdrop Options tab, located in the Windows section, and set the background colour to white. Once you are happy with your lighting setup, do a quick render where the horizon line can be seen. In the render output, sample the RGB values by clicking on the render where the horizon is the darkest. The RGB values will appear at the top left of the screen. Plug these values into your sky and ground squeeze and change your Zenith colour to white I.

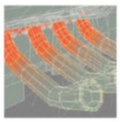


J

10 Window surface attributes Begin adjusting the glass surface by clicking the T in the Transparency section and change the layer type to gradient. Choose incidence angle for input parameters and adjust the gradient to increase on the bottom. Although a gradient is not essential in the colour or diffuse, a similar effect is used there. Lastly, one of the most important aspects is to add a Fresnel effect in the Shaders tab. You may have to load this plug-in by using the Set Content Directory function. Set the Fresnel reflection and specular to 89%, diffuse to 15% and transparency to 45% J.

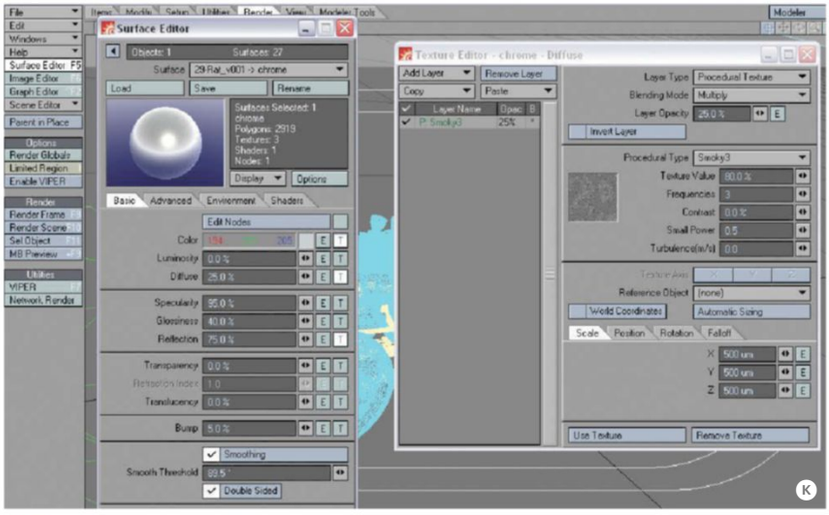
Mental workout

You would not expect a novice to out lift a pro weightlifter, nor should you expect a beginner artist to create a masterpiece. It takes time and a lot of hard work to build up strength. If the gym is the place where weightlifters build up muscle then the library is the place where your mind builds up thoughts. Just as fitness is not limited to the gym, our mental fitness is not limited to the library. Start out with challenges within your own limits and don't try to outdo anyone. Set realistic goals and break out of old bad habits by replacing them with new good ones. One of the great features we have is our ability to adapt to our surroundings. Use that to your advantage and surround yourself with things that inspire you to do better. Keep a watch your mental diet and the media your mind takes in. Your brain is the strongest, most precious muscle in your body, so take care to keep it in good health.

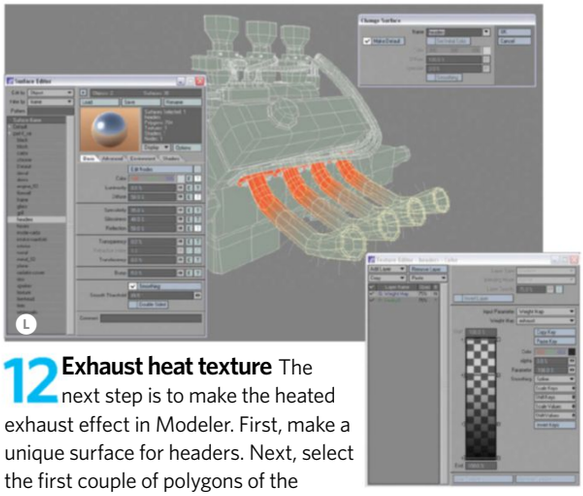


Speciality surface attributes

These next few surfaces are a bit more technical



11 Chrome surface settings To make the chrome surface, lighten up the colour and set the diffuse to 25% or lower. Remove the noise on the bump and add it to the reflection by copying and pasting. Next, raise your specularity to 95% and reflection to 75% and set the glossiness to 40%. To add the final touch, use the Fresnel effect just as in the previous step, but change transparency to 0% and uncheck it. It is important that you set it to 0% otherwise the plug-in will still calculate the transparency even if unchecked, adding rendering time K.

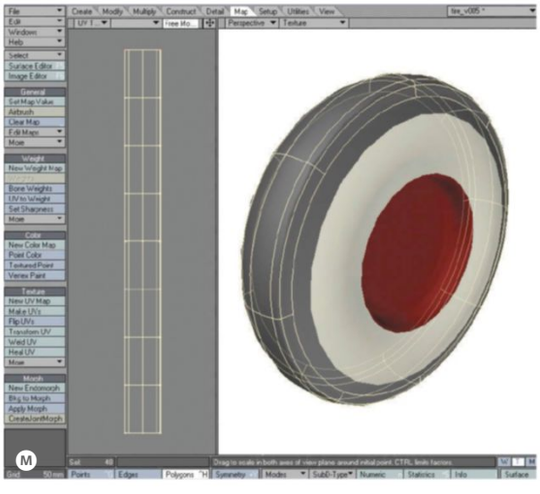


12 Exhaust heat texture The next step is to make the heated exhaust effect in Modeler. First, make a unique surface for headers. Next, select the first couple of polygons of the headers nearest the engine block. In the Map tab, click on the New Weight Map button and name it 'exhaust' with an 89% value. In the Surface Editor, copy and paste the chrome texture by right-clicking the chrome surface name in the list and paste it into the headers surface in a similar way. Modify the colour and reflection texture editor by adding a gradient with the weight map as the input parameters L.

K Use low diffuse and high reflection to make chrome

L Apply texture weight map for header details

M Prepare tyre geometry for bump map texture in Modeler



13 Tyre texture in Modeler Select the polygons on the outer edge of the tyre and set a new surface named 'tyre-tread'. With those outer polygons still selected, create a new Texture map. Name the map 'tread-bump' then change the Map Type to Cylindrical, SubPatch Interpolation to SubPatch and set the Axis to X. In the UV Texture view-port, hold the Shift key and rotate the polygons 90 degrees and scale them up vertically. Holding the Shift key will constrain your rotation by 45-degree increments and better control scaling M.

Model practice

Practise building cars and try modelling new things to keep your ideas fresh. Idea building is essential to improving your skills. Every time you model something new, you gain new ideas to incorporate into your next project. The only model that really fails is one you do not learn from.

Artist showcase

Alex Villarreal

When I was in elementary and middle school, I used to draw cars all the time on the back of my assignments or any blank piece of paper. Since none of the sketches looked like the car I was trying to draw I started making up my own designs. I later enrolled in a technical high school to learn about design and CAD-based technology. There I learned the fundamentals of 3D

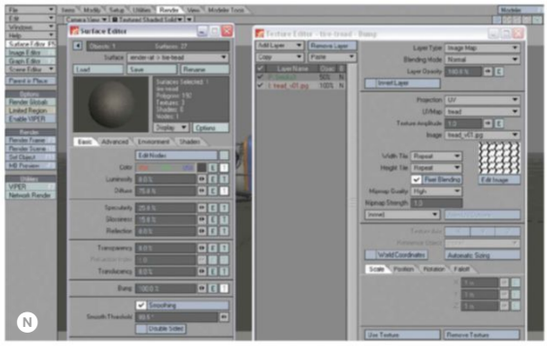
The Nebularis **LightWave 3D (2011)**
This is my homage to one of the greatest hot-rod visionaries, Ed 'Big Daddy' Roth. I always liked his wacky bubble cars and wanted to push the 1960s sci-fi design.

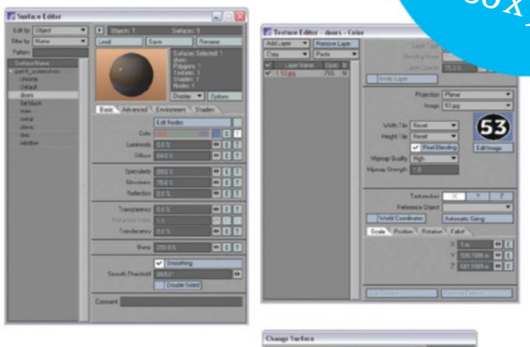
Rat Gas **LightWave 3D (2010)**
This is my friend's '29 Ford Model A rat rod. He had a wild idea of making a gasser-inspired rat rod and Rat Gas was born.

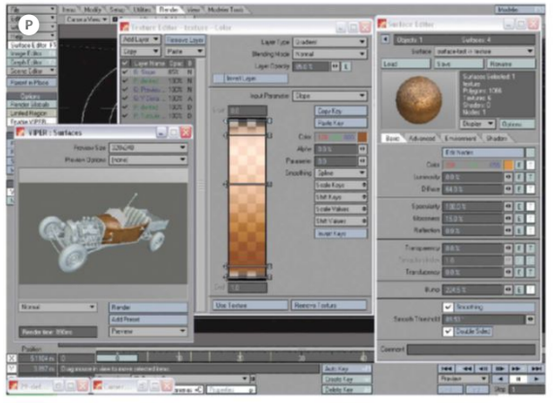
Final textures and render

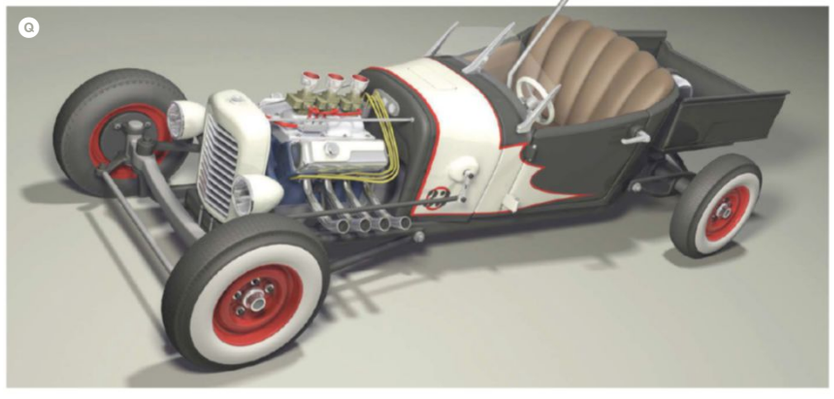
These are the remaining essential textures

4 hours render time
Resolution: 6,000 x 3,500









14 Applying tyre texture Change the tyre surface default colour to a dark grey (not black), lower diffuse to 75% and increase bump to 100%. Copy and paste this surface into the tyre-tread surface and in the bump texture editor, add an Image Map layer. Change the projection to UV and select tread-bump. You will need to make an image that will repeat on the top and bottom seamlessly and apply it in the image parameters. Set the Width and Height settings to Repeat and for higher render resolutions you may have to increase your texture amplitude **N**.

15 Adding decals to model In Modeler, select the side panels of the doors. Change surface name to 'doors' and copy and paste the main surface properties into it. Use the surface colour as a background in an image-editing program and create a decal. Next, add an Image texture map in the colour properties for the door surface. Load image, set the width and height to Reset, and use Planar projection along the X axis. Click automatic size and adjust scale and position tabs to set the decal in place **O**.

16 Making rust texture For the rust surface, much experimenting was done using the VIPER preview plug-in. To access VIPER you must first enable it in the Render tab and have the Surface Editor open. Render the frame, then click the Render button on the VIPER preview window. I used gradients with slope input parameter with key frames on top and bottom at 0% alpha to let the base colour show through. It is important to have the decal image at the bottom of the layers so the effects overlap the image **P**.

The King Rat Rod **LightWave 3D (2010)**
This particular car is where it all started for me. I had been accustomed to more traditional cars, but when I saw and heard this monstrosity I was completely blown away.

N Apply UV tyre bump texture in the Surface Editor

O Apply a simple decal by using planar-projected image maps

P Experiment with carefully layered and blended texture effects to make the rust surface

Q 1960s-style Kustom variation

How to be a natural

There is no secret to being naturally good at something, just a natural inclination to do it. When you start to listen to yourself, the work gets easier. Listening to yourself does not mean you have to go into a quiet room and strain your ears for a whisper. On the contrary, you must go out and be exposed to many different things and what interests you will stay within you. That resource within you is what makes artwork unique and genuine. The way you become naturally good at something is to do what is natural to you.

17 Variations of truck Once you find the render settings you like, set the resolution to 400% and let it render. If later on there is a small part that is to your dislike, use the Limited Region option and patch-render the spot you wish to fix. You can do different versions by changing only the surface properties. This custom version was made using similar techniques on step 15 and alterations to various surfaces. The only mesh modifications were to the radiator and adding a window **Q**.

Architectural visualisation

Find inspiration in the world around you and achieve some interesting arch-vis creations

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Insight into arch-vis in the UK

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Re-create a stylish family home

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Panoptican

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Achieve a photorealistic look

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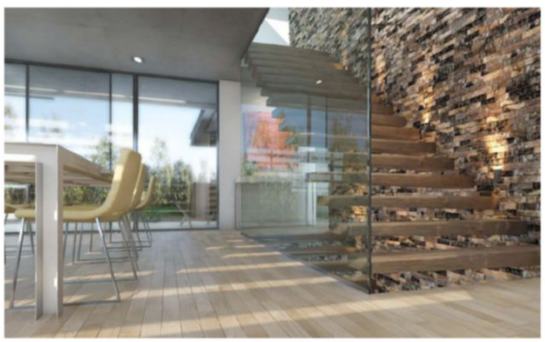
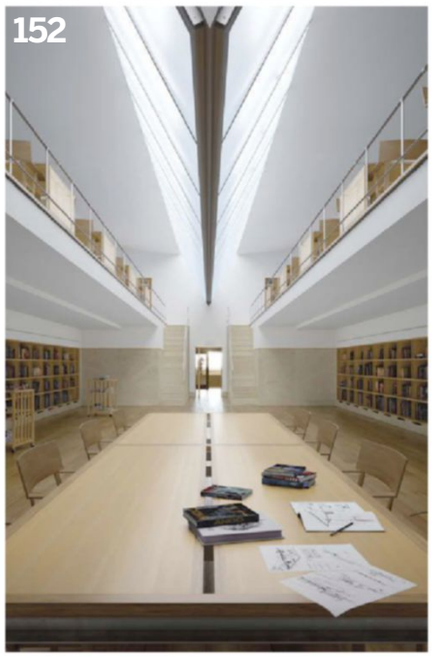
Bring an outdoor village to life

164 Creating realistic visualisations in Blender
Achieve good-looking interiors





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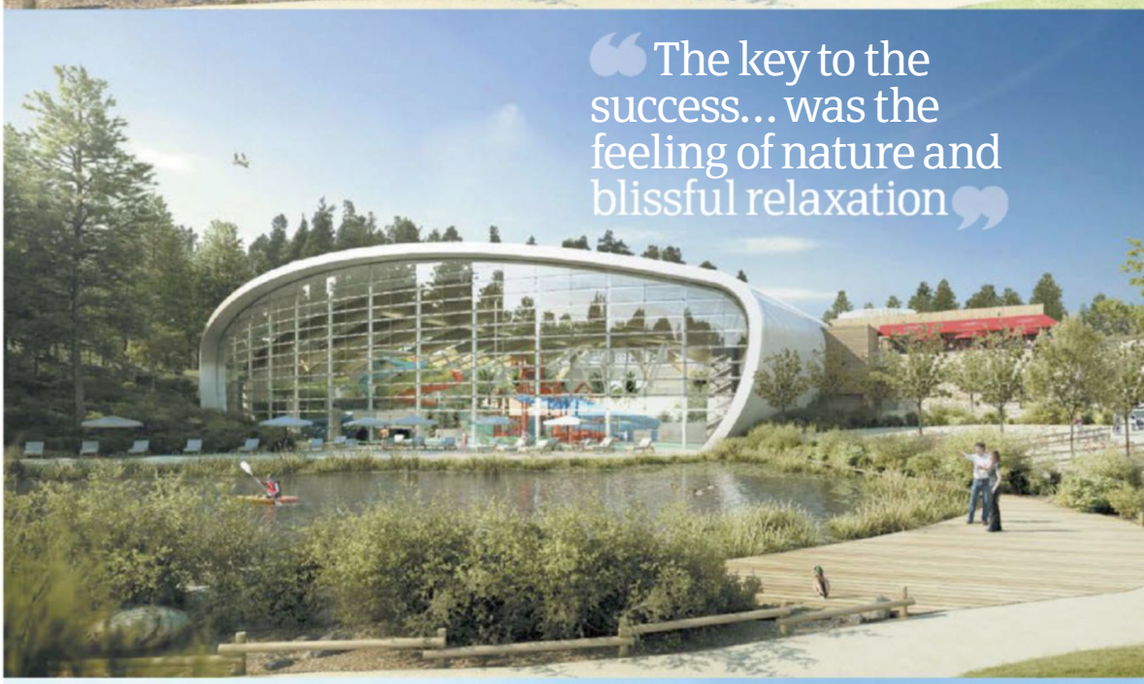
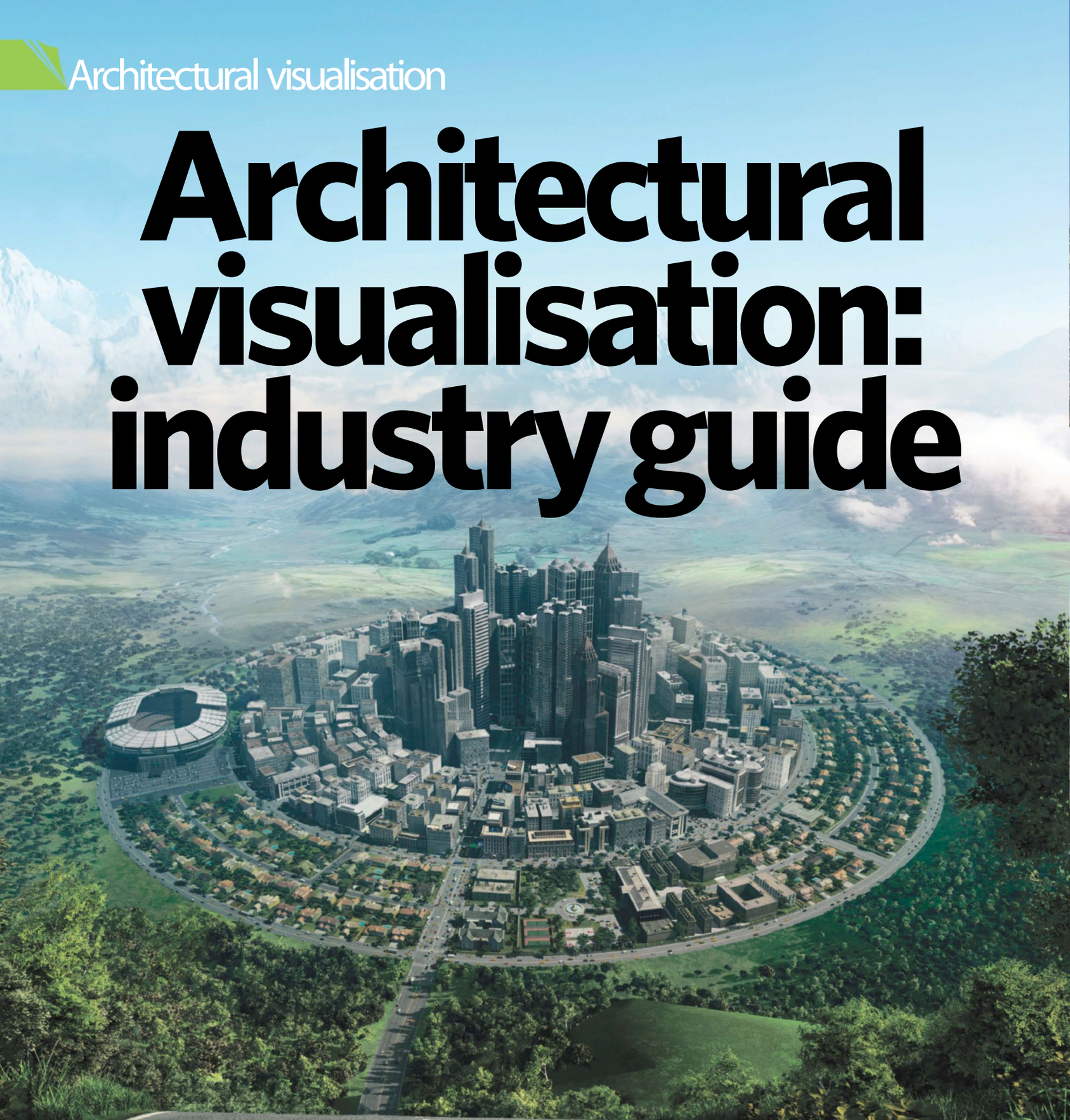

“The key to the success… was the feeling of nature and blissful relaxation”

Architectural visualisation: industry guide



Taylor James
www.taylorjames.com
Name
Anna Roberts
Position
Director and general manager

Glowfrog
http://glowfrog.com
Name
Nigel Hunt
Position
Managing director

Hayes Davidson
www.hayesdavidson.com
Name
Matt Clinch
Position
Associate partner

Uniform
www.uniform.net
Name
Nick Howe
Position
Managing director

IDF Global UK
www.idfglobal.com
Name
Guy Costley
Position
Director of IDF Global UK

CGarchitect.com
www.cgarchitect.com
Name
Jeff Mottle
Position
President and CEO

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©Glowfrog

A Taylor James controlled production of this Motorola website, which involved using design agency Soulpolice

B This is a blend of CG and photography. The glass genuinely reflects and refracts its surroundings

B
©Taylor James

> "I think the UK generally has a very good reputation for high-quality CGI production, for arch vis and more broadly in advertising and film"
>
> **Anna Roberts,** director, Taylor James

©Hayes Davidson

Hayes Davidson and photographer Nick Wood came together on the Shard 2012 project

Words: **Poz Watson**

Contrary to reports and despite a slumped housing market, the UK's architectural-visualisation market is now stronger than ever

The UK architectural-visualisation industry has suffered a bit of late. First there was the global recession, and the particular hit the housing market took, and then there was the view some people had that the UK wasn't the place to go if you wanted to work in this area. But actually, the big arch-vis companies have found that business has picked up, and there are plenty of reasons to be happy working in the UK – and that applies to students too, as all the companies seem to be hiring.

One of the big players is visual effects and visualisation company Glowfrog, which worked on the Millennium Dome and has spent the last ten years working on the Greenwich Peninsula project. Nigel Hunt, MD, explains that the latter was a particular highlight because "the clients asked us to design the buildings under the guidance of the developer which was interesting for us to do." Hunt's take on the UK industry is that it has a big advantage in that "we have some of the best architectural practices in the world here, working on global projects so we have proximity to these clients. A disadvantage to globalisation is the fact that some UK architects are using foreign companies more regularly." He goes on to explain that this makes things difficult for companies in the UK because "we are in one of the most expensive countries in the world with a high standard of living, but we have to keep our rates internationally competitive to compete for work."

Anna Roberts, director at Taylor James, believes that the UK's reputation for quality has stood it in good stead during the lean years. She explains: "I think the UK generally has a very good reputation for high-quality CGI production, for arch vis and more broadly in advertising and film. For arch vis that demands quality and realism, the UK is one of the key regions where you can be sure to find the right talent. Being able to deliver a photorealistic image requires huge levels of skill, both in CGI and retouch and the UK has some of the best studios and artists in the world."

Guy Costley, director of IDF Global UK, has a clear view of the differences between the UK and abroad. He describes the UK style of visualisation as being "more reserved, minimalist and definitely

©Hayes Davidson

The tallest building in Europe: what it will look like, according to Nick Wood and Hayes Davidson

How to get into the biz

Just visualise yourself succeeding – the big agencies all think talent and a willingness to learn is what counts

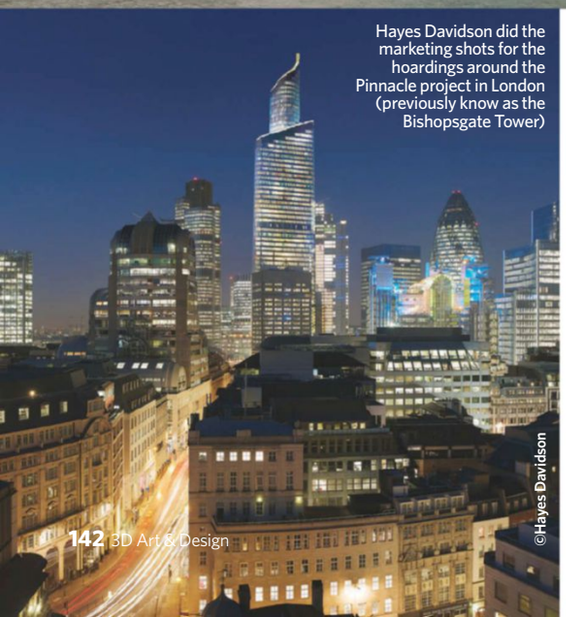
Unlike other areas of 3D, there isn't much concentration in universities on architectural visualisation, so it would seem that talent is the most important factor when it comes to landing a job.

Nigel Hunt, MD of Glowfrog, explains: "There are only a handful of institutions that provide professional visualisation training for this industry globally. There is no qualification – I wish there was." Anna Roberts, director at Taylor James, adds: "No one hiring graduates is looking for the finished article. Each studio is going to have its own pipeline that new staff have to adapt to, as well as new plug-ins, software, etc, to learn. What they need is talented, hardworking people with a professional attitude."

At IDF Global they have a programme to give graduates professional experience. UK director, Guy Costley, says: "They get to work on real projects – but not mission critical or highly complex projects. These graduates come under the tutelage of the senior team leaders and are required to work in a professional environment... We find that only two or three out of five people will make the jump into a fully productive team member."

At Taylor James there is a clear workflow that it is vital new employees fit into

©Taylor James



Hayes Davidson did the marketing shots for the hoardings around the Pinnacle project in London (previously know as the Bishopsgate Tower)

©Hayes Davidson

more creative when compared with Asian or American companies." He admits, however, that the US arm of his company is doing better than the UK one: "Based upon global sales across our organisation America is leading the way currently with some interesting projects moving slightly away from bricks and mortar and more into building other assets. The China market has exploded, but the values per project are still way below the UK and US as they are not so conscious of quality."

But wherever you look in the UK, visualisation is doing well. As Hunt simply puts it: "Visualisation at the moment is booming. Every company that I know – small, large, freelancers – everyone is busy." And this sense is echoed around the industry. Nick Howe, MD at Uniform, says that they have seen "rapid growth in the past 12 months after two years of pretty slow work. Lots of projects which were previously cancelled or put on hold are now back on track and new and exciting things are happening. It seems like the property/real estate market has picked up and developers are beginning to invest again with confidence, which thankfully means there's plenty of work to do!"

Roberts echoes the notion that the whole creative industry had a "slow start to the year, but towards the backend, we are seeing a lot more campaigns coming through the door. While it's great for things to be picking up again, a little downtime here and there allows us to move forward with some of our own internal and portfolio projects that test out new methods and also innovate methods of visualisation. We're never sitting still."

London Gateway port and logistics park

IDF Global UK was charged with conveying the scale of the UK's newest deep-sea container port, and what will be Europe's largest logistics park

When IDF Global UK was given the London Gateway project, the brief was to "create a presentation that the client could use to promote this new development," says Guy Costley. Although "the modelling [was] basically big sheds," the real challenge was to create an animation to show off the scale of the site. To do this they "developed the story of a cargo box, animating a super container, the full workings of a 24-hour operational port, linked to a multi-modal network of cranes, trains, cars, lorries and people." And the client – DP World/London Gateway – was pleased with the results. Xavier Woodward, communications manager, explains that they needed an innovative way to communicate not only the size of the project, but "also all the infrastructure issues associated with it in a way that would have relevance to a diverse audience including journalists, politicians, residents, businesses, regulatory stakeholders, charities and educational establishments." He adds that IDF's presentation "surpassed our original objective to create a real 'wow' factor presentation to impress and inspire – the feedback has been amazing."

©IDF Global

> "If you look around, you'll find all the good studios are recruiting. For us, it's not about qualifications, it's about talent and ambition"
>
> **Nick Howe,** managing director, Uniform

Costley says that IDF Global UK used the 'downtime' to consolidate the company too, explaining that they had to "diversify from just creating architecture and look towards other areas such as engineering, energy and model building. The values are there in other sectors, but as these are established areas it is hard to make great inroads – but we are getting there."

And since things are now looking positive across the board, all the big architectural-visualisation companies are on the lookout for young, talented graduates, the emphasis being on the talent. Howe says there aren't enough appropriate graduates coming through at the moment for "the level of work being produced by the top studios and for the current demand in the market." He continues: "If you look around, you'll find all the good studios are recruiting right now. For us, it's not about qualifications, it's about talent and ambition."

Howe confirms that Uniform is "always looking for talented graduates" and explains that the best way to approach the company is to send a CV and "a carefully selected set of three to five images, and make sure it goes to the right person." For Taylor James, finding "generalist artists who can take a project from beginning through to completion and this sort of skillset in an industry which is increasingly choosing specialisations can prove challenging," but usually the key, according to Roberts. While Howe says that, at Uniform, "the key things we look for are artistic ability and an eye for what looks good; passion and ambition; and a real appetite to learn. A basic technical ability is important but we can teach and develop technical skills – we can't teach the other stuff!"

But universities are getting the message that architecture is a viable field for 3D students to get into. Matt Clinch, associate partner at Hayes Davidson, says that his company is "actively engaging with universities in trying to establish a closer link for internships to allow students to get hands-on experience of production and a better understanding of the industry. Having said that, our artists come from a wide range of backgrounds, so no architectural experience or specialist training is necessarily required if you are motivated and have a [strong] portfolio and good experience."

But, of course, wherever the recent graduate ends up, they have to learn a new hardware and software setup. Glowfrog uses mainly 3ds Max 2012 and V-Ray, on BOXX workstations, while Uniform requires its team to regularly use 3ds Max, V-Ray, Fusion, Premiere and After Effects on Dell T7400 workstations. At IDF Global UK, "the pipeline is based on a Windows 7 64-bit system, with the main 3D package being 3ds Max for modelling and

Taylor James created this range of houses for a string of billboard ads for O2

©Taylor James

This is the planned restaurant at the top of the Shard, as imagined by Uniform

©Uniform

©IDF Global

IDF Global was charged with creating five different shots of the Big Springs Ranch project for the McNeal Group, which included three internal perspectives

> "I think there has been a need to approach the development of imagery in a much more thoughtful way to stand out from the crowd"
>
> **Matt Clinch,** associate partner, Hayes Davidson

texturing with V-Ray for rendering." Hayes Davidson uses 3ds Max Design 2012 too, alongside V-Ray and mental ray, and of course, all the companies mention Photoshop as being critical to their needs, so no matter what sort of role you're aiming for, at least a passing acquaintance with all of these programs is useful.

But like all other areas of 3D, the expectations in the world of arch vis are constantly changing, and students interested in it need to keep ahead of the game. One thing Hunt has noticed from his work at Glowfrog is that there are simply "less architectural films being commissioned. Clients are more cautious about how they spend their money now." But the dubious economy is not the only reason that the clients' demands are changing. Uniform's Howe says that over the past few years "we've seen a big improvement in the general standard of work across the industry. Architects are increasingly producing some great visualisation work in-house and clients are now turning to the top studios only for really polished marketing work, or for huge-scale projects where multiple schemes from different architects need to be brought together."

The reaction to the adoption of 3D by the architects themselves is that the arch-vis studios are branching out. Howe goes on: "The better studios are also diversifying into broader digital communications agencies, working across multiple disciplines: advertising, branding and design, as well as architectural visualisation. They're also innovating to set themselves apart, often looking at new technology and techniques like augmented reality, stereoscopic production, projection mapping and exploring the possibilities of what can be done with technologies like Microsoft's Kinect."

And it's not just Kinect that's exciting people, technology-wise; iray is also getting people talking. Costley says: "Anything that helps increase the quality with the timeframes we are used to is good. Our studio is constantly trialling new software and hardware, not to make the process easier but to create better value for our clients." And what those clients want is changing too. Roberts says that she is seeing "a big call for more creative and original architectural solutions which still retain the accuracy and feel of typical illustrations. Consumers want both realism and creativity to really make their

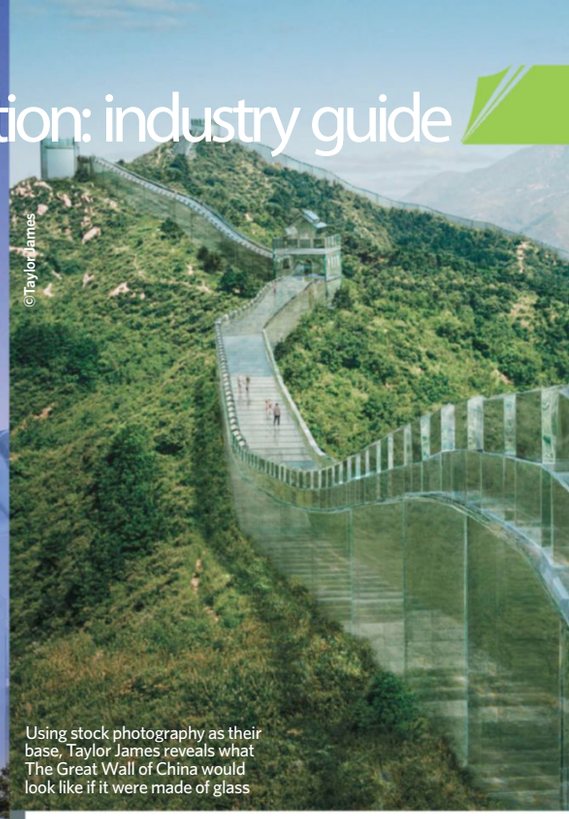
Uniform had a core team of three working on the Birmingham New Street redevelopment project

The redevelopment of Birmingham New Street

The revamp of Birmingham's main train station was a big challenge for Uniform's 3D creatives

Over 140,000 people use Birmingham New Street station every day – double the number it was designed to cater for – so a massive redevelopment is in progress. Network Rail and Foreign Office Architects (FOA) asked Uniform to create six images and a two-and-a-half-minute film for use in press, marketing and on TV to explain the process. MD Nick Howe says: "We had a core team of three with a maximum of four artists working on it at any one time, and we spent around five weeks on the project. Our creative approach was to tell the story of the journeys different people take and our treatment was a single continuous camera move over a 24-hour period which captured the activity of the new transport interchange. The biggest challenge for us was weaving together the activity of multiple people and various modes of transport in one take."

This Saffron Square project was a double award winner for IDF Global



©TaylorJames

Using stock photography as their base, Taylor James reveals what The Great Wall of China would look like if it were made of glass

campaigns or visualisations stand out from the crowd." And as the software improves, there is also an increased demand for more immersive visualisation. Roberts says that in a piece Taylor James created for Motorola, "we built an entire city, complete with several video fly-throughs to show various sections of the community. This was so popular that Motorola also went the extra step to turn it into an interactive website."

Clinch adds that at Hayes Davidson, they have "definitely seen a more considered approach to the visual material that marketing agencies and developers are using to promote their schemes."

He continues: "As the visualisation industry has grown, become more accessible and been more readily used, I think there has been a need to approach the development of imagery in a much more thoughtful way to enable it to stand out from the crowd. As with the visual effects and animation industries, using good reference material has become essential to producing top-quality work."

Great 3D films might be expensive, but they're a damn sight cheaper and quicker to produce than the skyscrapers and harbours and stadiums they promise. So while the market has had a tough few years, the future is looking bright for architectural visualisation. What's really changing is that the standards are racing upwards – from simple, rough representations to real artistic depictions. Nick Howe sums it up, "What is differentiating the good studios now is their ability to create images and films filled with mood, feeling and emotion."

Jeff Mottle

The president and CEO of CGarchitect.com explains the way the visualisation industry has changed

3D Artist: How has the recession hit visualisation?
Jeff Mottle: During the boom there were a countless number of visualisation companies, dedicated rendering firms and almost every architectural firm had some sort of in-house rendering department. When the economy turned 40-60 per cent of the industry lost their jobs worldwide. This of course resulted in a dramatic decline in the workforce and its landscape. Many of the freelance or smaller companies went out of business, many architectural firms shut down their visualisation departments and the larger, more successful visualisation studios started to look to diversify their companies to cater to other fields outside of architecture and the type of deliverable they could offer. The last 12 months have seen a really strong recovery for many of those who survived and, indeed, the majority that I've spoken to have more work than they can deal with now.

3DA: How does the UK arch-vis industry compare to the rest of the world in your opinion?
JM: While something of a generalisation, I tend to find the quality and refinement of the visualisation created in the UK to be two to three years ahead of the rest of the world. That gap has been narrowing in the last few years, but there's something about UK visualisation companies that has always impressed me.

A CG view of the Olympic Park from one of the offices in the 4 million sq ft International Business Quarter in East London

©Glowfrog

Light and render a house

K house 2011

> Patric wanted to make a cosy but stylish family residence positioned by the ocean at twilight

Patric Verstraete is the founder of arch-vis studio Vizcon3d

The idea for this scene appeared when I came across some random images on the web and, from that very moment, I was charmed by the house design of the Lefevre Beach House that is presented by architectural firm Longhi Architects.

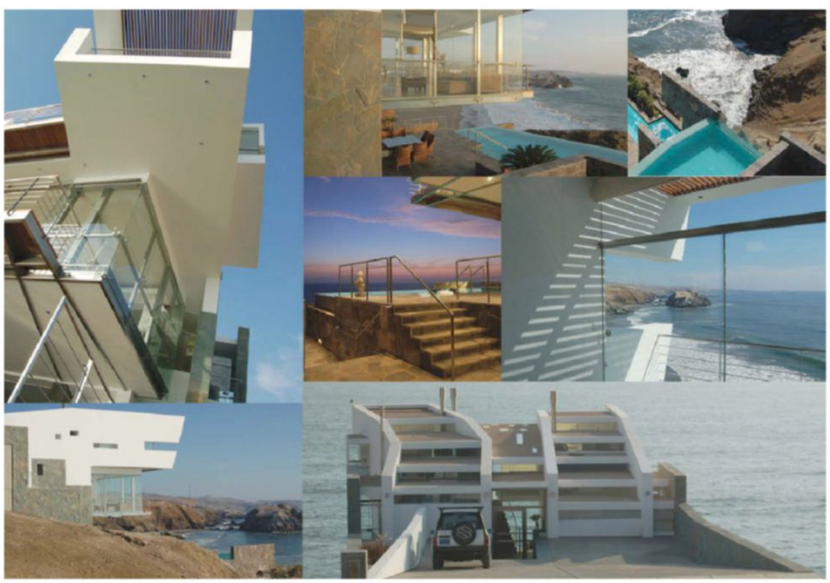
The site of this property is located at the meeting point between the Pacific Ocean and the arid Peruvian desert on Punta Misterio near Lima. This cool but cosy residence is enriched by both the sand and water environments.

On starting this project I signed up to the exteriors training course at CG WORKSHOP (**http://cgworkshop.org**). It was with the pro guidance of Pawel Podwojewski, aka 'simonhc', that I achieved the final renders.

My main application in the design process was 3ds Max 2010 for modelling and texturing. The BRIX plug-in for 3ds Max and a number of scripts such as FloorGenerator were also used, while Photoshop came in handy for postwork and V-Ray 2.0 produced the final render.

Inspiration

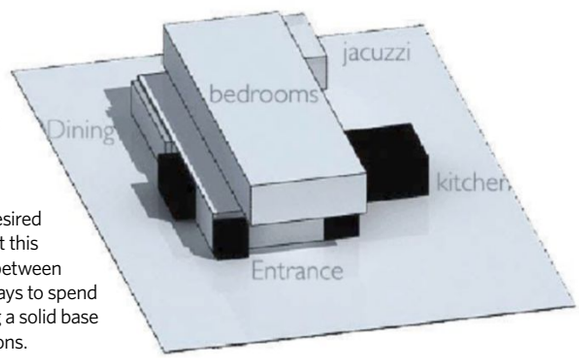
Establishing the foundations



Concept In my opinion you should always gatheras much reference and inspiration as possible. Before you create the first polygonyou should already haveat least some direction and ideas aboutwhat it is you're trying to achieve.

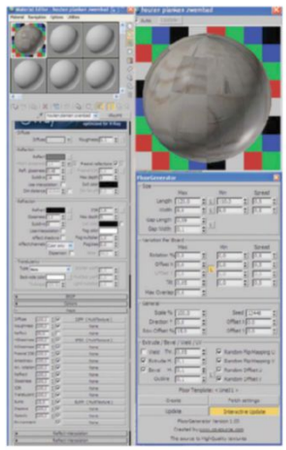
01 Start modelling

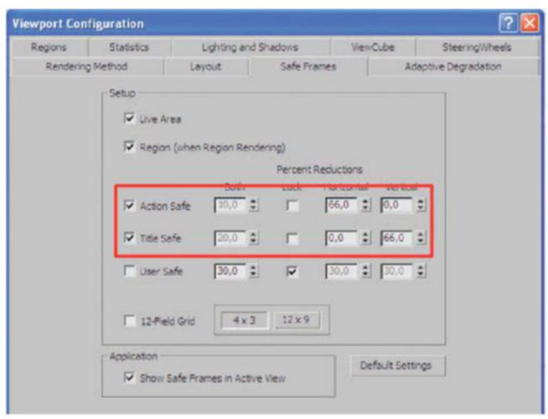
When it came to modelling I concentrated on the main building, pool, poolhouse and deck. Everything in the scene is straightforward polygon modelling. I really tried to tweak the foundations and measurements until I had the desired look and feel of the space. In fact this stage took me several weeks – between coffee breaks! But it definitely pays to spend a good amount of time finalising a solid base for your architectural visualisations.



02 Decking out

I opted to model the pool deck as opposed to using textures. I used the FloorGenerator script to do this: see **www.cg-source.com/floorgenerator.php**. I work with this a lot – even for walls/facades. This script won't work on vertical faces, so you have to lay out facades horizontally to apply cladding etc; after that you can turn them back upright. This is one of those simple tools that can really take your arch vis to the next level. Take a look at the settings (right) for a guide.





03 Rule of thirds

For the composition, I relied on the well-known rule of thirds. The basic principle behind this is to break an image into three sections – horizontally and vertically, so you get nine parts. You can make a grid in the viewport to better organise your 3D scenes. Just go to Configure> Viewport Configuration and set the values as above.

Light and render a house

Software used in this piece

3ds Max | V-Ray | Photoshop

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Patric Verstraete

3DArtistonline

Username: Vizcon

Company website
www.vizcon.be

Country Belgium

Software used
3ds Max, V-Ray, Photoshop

Expertise Patric is an architectural-visualisation artist located in Belgium. He started out as a freelancer in 2009 and now heads up 3D arch-vis studio Vizcon3d

Modelling
Lighting
Rendering

Source files available

Outdoor furniture models

Artist showcase

Patric Verstraete

I did my degree in interior architecture, as I was interested in computing as well as everything involved with architecture and interiors. An interest for 3D graphics arose and I started to experiment with 3ds Max. Soon after I founded my own company, Vizcon3d, as my secondary occupation.

K house pool deck **3ds Max, V-Ray, FloorGenerator (2011)**
Another view of the K house, this time from the pool deck

K house stairwell **3ds Max, V-Ray, BRIX plug-in (2011)**
My intention when starting the K house project was also to make some interior scenes of the property. The table in this shot was modelled by myself, while textures were taken from CG-Source, Arroway and CGTextures – which are all great 3D resources

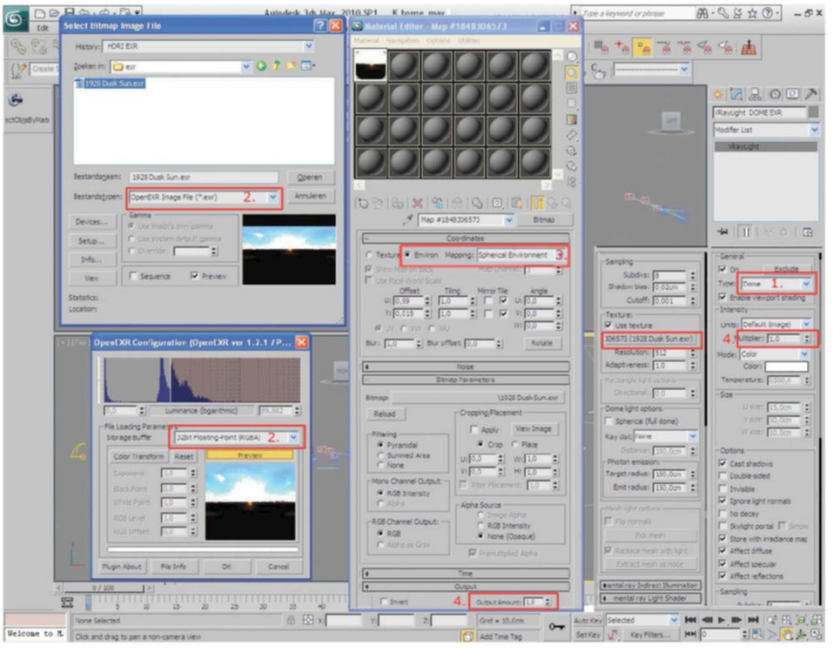
Lounge chair **3ds Max, V-Ray (2009)**
This is one of a large set of interior images that I made for Belgian construction company Matexi

Twilight zone

Let there be light…

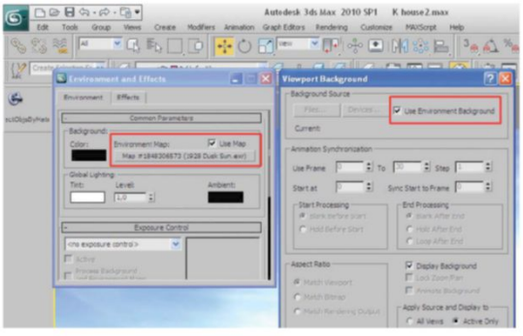
Tip
Before the final shot I use a small version of the EXR image to reduce memory usage and to gain fast draft results. But be sure that for the final renders you use the high-resolution image otherwise you may lose your background details!

04 **Create a twilight feel** From the get-go the idea was to put the building into a twilit environment. After some experiments, I decided to use a VRayLight Dome with an EXR image created by the very innovative artist Peter Guthrie. (Image title: 1928 Dusk Sun.)



05 **Importing EXR files** To load the EXR into 3ds Max, I created a VRayLight Dome and assigned an instanced EXR image to the lighting texture map slot(1). When I was done importing the EXR image, I chose Real Pixel Float (32bit) from the Open EXR importer settings. Next I set the Mapping type to Spherical Environment and the Output of the EXR to 1. I also changed the VRayLight Multiplier to 1.

06 **Rotate the EXR** To rotate the EXR I needed to enter a U Offset value between 0 and 1, so to rotate 90 degrees you'd need to enter 0.25, for 180 degrees you'd enter 0.5, and for 270 degrees, 0.75, etc. You can also set the V value at this point if you wish to establish the horizon.



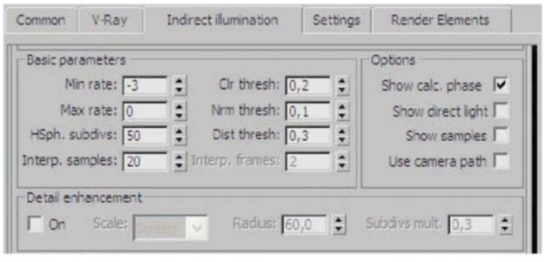
07 **Wrap up the exterior lighting** Finding an appropriate horizontal position for your light can easily be done by assigning the same EXR image in your Material Editor to the viewport background just to show the desired position. If you're following this workflow exactly you must use the same EXR you used for the dome light because this new position will be automatically assigned to the light source.

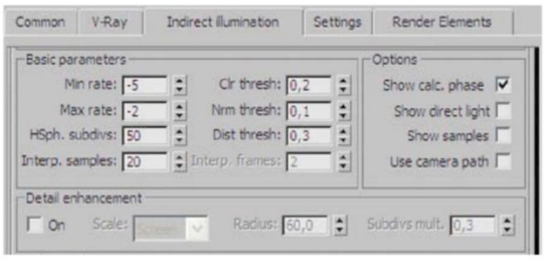
08 Interior lights If populating the scene with many lights, you need to take care with how you organise them. Using different names is useful if you plan to have dozens of light sources. For this purpose I used Light Lister for V-Ray Advanced 1.50, developed by 3DZver; this can be found on **www.scriptspot.com**. Most of the interior lights in the scene are photometric lights with custom IES files.

Time to render

The end's in sight

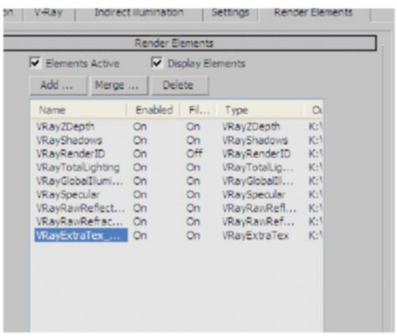
09 Render settings At this stage I had big problems with my main PC, so I decided to render on an older machine; that's why I had to be very careful with render settings to avoid crashes when producing the high-res images. It took me several tests to find a way to create a 2,800 x 2,432px image. I first rendered the images at a lower resolution (700 x 608px) and saved the Irradiance map pre-passes plus Light cache map for later. By using these maps, when you render your final image, you will skip the Irradiance and Light cache process and go straight to the render itself and, so, cut down render times.

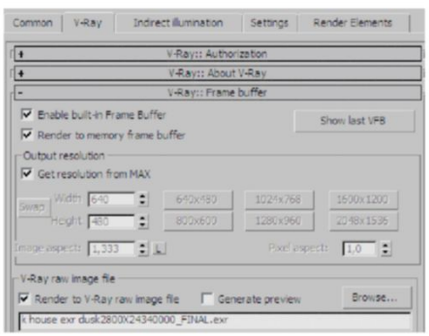




10 IRR map settings I set the Min and Max rates to -3 and 0, respectively; this makes for a high-quality Irradiance map. If I were to render the final image with these settings the application would crash, but since I was rendering at a lower resolution just to save the Irr and Light cache maps it wouldn't take more than half an hour. After the Irr and Light cache maps were calculated I went back to the render settings and set the resolution to 2,800 x 2,432px.

11 A little light reading I also changed Single Frame to From File, and chose the saved Irradiance (VRM) file and the Light cache (VRL) file. I reduced the Rate settings by 2 to give me a Min rate of -5 and a Max rate of -2. More information on how to calculate these tricky settings can be found in *VRay – The Complete Guide* by Francesco Legrenzi.





12 Render elements With V-Ray it's possible to save all render elements into a single OpenEXR file, which enables you to open one tidy file in Photoshop. All of the render passes will be on separate layers, ready for you to edit independently.

In for the long haul...

If you are the type of person who wants fast results, you might be disappointed when it comes to CG imagery, since it can take many years to master it. If you are like me, it took me several years to discover what 3D is really about. The most inspiring thing for me is observing things around me in the real world. This can be anything from visiting museums, or walking around towns and the wilderness.

Of course, sometimes you need a little push, and that's why I subscribed to the training at CG WORKSHOP. In those few weeks, I learnt more than I would in a whole year just searching aimlessly around the web for answers. This project could never have been so successful without the help and advice of the staff at CG WORKSHOP – and especially Pawel Podwojewski – so my thanks go to them!

13 Postproduction In my opinion, this is where the 'magic' happens. I have a set of adjustments that I apply to most of my images during postprocessing. In Photoshop I first do some corrections via the Selective Color, Exposure and Curves adjustment layers. Then I start to play around with the render passes, mostly blending with the Soft Light or Screen blend modes.

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Jonathan Gales
3DArtistonline

Studio name Factory Fifteen
Website www.factoryfifteen.com
Country UK
Software used 3ds Max, Photoshop

> The context environment/skyline was essential for this whole series to help tie them together as a body of work, but also realise that the architecture and environment has a sense of scale beyond the image

Software used in this piece

3ds Max Photoshop

Panoptican 2011

The Panoptican was part of a larger series of images and animation entitled *Megalomania*. *Megalomania* is a project that perceives the city in total construction; inspired by the incomplete states of world icons such as The Shard and Burj Khalifa. The built environment of the city is explored as a labyrinth of architecture that is either unfinished, incomplete, or broken. *Megalomania* is a response to the state of many developing cities, exaggerating the appearance of progress into the sublime.

> Detail is important to me – I get quite into modelling and texturing some elements, which can really pay off when building a large scene

I made this. . . Panoptican

> The composition and architecture of this project references Jeremy Bentham's Panopticon as well as Piranesi's Carceri plates. References are great for inspiration, both in terms of imagery and the theory behind a project

> Volume and depth are essential to my imagery as they can define the atmosphere and space. Having studied architecture I'm really conscious of spatiality and what a scene would be like to inhabit

Architectural visualisation

Source files available

Casas do Forte Final Images.zip

Software used in this piece

3ds Max 2011 · V-Ray 2.0 · Photoshop · After Effects · MultiScatter · FumeFX · Magic Bullet Looks · ProEXR

Lighting for day and night scenes

Modelling
Lighting
Rendering

Casas do Forte Interiors 2010

> This was a commissioned work where a lot of things were controlled by the client. The goal was to achieve a photorealistic look for commercial printing and outdoors without losing the digital art feel

Jacinto Monteiro, founder of Metro Cúbico Digital, is an architect who specialises in architectural visualisation

This 'making of' will be divided into two major light setup parts: Day and Night. You will learn mostly what is needed to set up day and night lighting conditions in an interior scene, as well as modelling and texturing basics, camera settings, rendering and 32-bit post production of each part. We will also cover extra basic setups such as Hair and Fur modifier to create the carpet, the MultiScatter plug-in to distribute grass and VRayEnvironmentFog to affect the night outside the house.

Here you will learn how we used VRayDomeLights, IES Lights, VRayLightSpheres and Planes among other solutions to render the scene and improve the image in the post production pipeline. Overall, the 3D work process wasn't linear, as it needed lots of testing and tweaking, so we will try to look into that development and understand it.

For one of the night shots, FumeFX was set up inside the fireplace. Although it doesn't have much significance in this scene it affected the light and reflections in certain areas. We will also talk about other ways of creating a nice fireplace in a much quicker way.

The biggest challenge in this 3D commissioned job was to maintain a good art work without looking too commercial.

Step by step
Easy-to-follow guides take you from concept to the final render

Artist info

Jacinto Monteiro

3DArtistonline
Username: Metrocubicodigital

Personal portfolio site
www.metrocubicodigital.com
www.metrocubicoblog.com

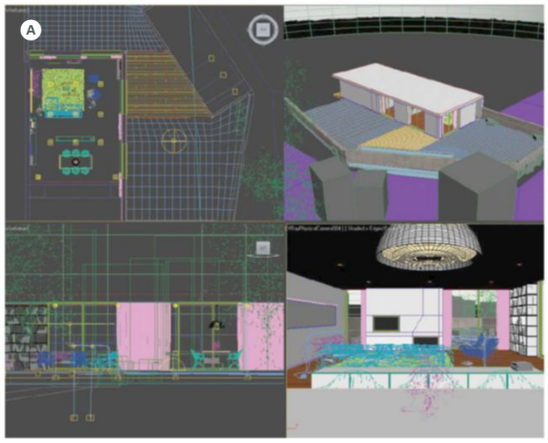
Country Portugal

Software used
3ds Max 2011, VRay 2.0, Photoshop, After Effects, MultiScatter, FumeFX, Magic Bullet Looks, ProEXR

Expertise Jactinto specialises in modelling, texturing and rendering photorealistic architectural visualisation

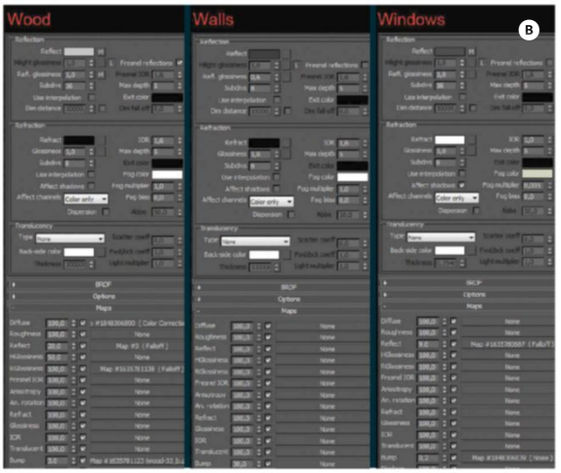
Modelling and more

Setting the scene and choosing its materials



01 Scene modelling The modelling is very basic. We started with a box for the walls and ceiling. The window frames were modelled using a line representing the section and then Sweep Modifier. For the ceiling light holes we simply placed small boxes and used ProBoolean (Subtraction) in order to have the holes modelled in the right places quickly.

Before doing any rendering tests we tried to fill the space with as many objects as possible and then converted the biggest size poly objects into VRayProxies Ⓐ.



02 Basic scene materials For the floor an Arroway Texture was used (no. 33). In the Reflection and Refl.Glossiness slot, we inserted a falloff with the corresponding reflection maps. The walls and ceiling material is basic and were fast to render. There is a slight reflection in them, as there should be in almost all created materials. The windows (double glass model) have a reflection grey value of 10, refraction of 251 and a soft green fog colour. In the options, reflection in the back side and double-sided was ticked Ⓑ.

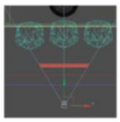
Ⓐ Some of the objects modelled, along with their positions for lighting

Ⓑ The options for three basic materials: covering wood, walls and window glass scene materials

Casas do Forte light tutorial concept

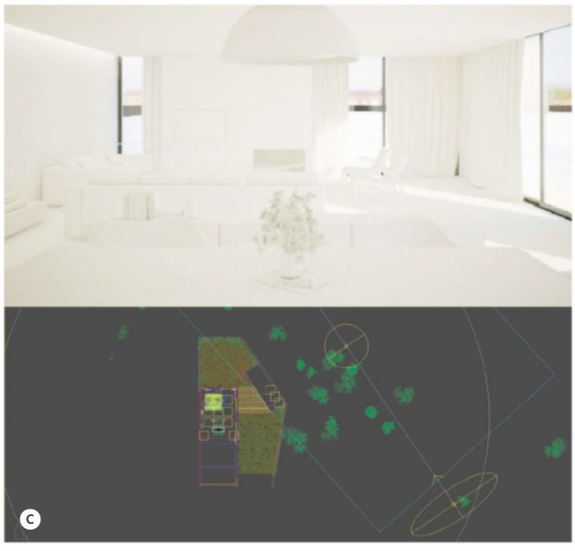
Portuguese architects are well known for their appreciation of simple and contemporary design. This is that case, where the architect created a simple interior. The design also had to respond to that same simple concept.

Being inspired by artists such as Alex Roman, Hcpiter or Peter Guthrie, the digital artwork had to be photorealistic, and for commercial reasons, the room should look occupied by a Portuguese middle-class family. For the daylight images we tried to make them feel naturally illuminated, in contrast with the warm inside versus cold outside of the night shots. The client had major decisions to make from modelling till the final output.



Daytime illumination

How to attach the VRayDomeLight, HDR and VRaySun rotations



C Rendering test of the daylight conditions without materials. Scene setup inside 3ds Max

D Settings of the VRay camera near the dining table

E Screenshot of all detail values regarding the VRay rendering settings in the day scene

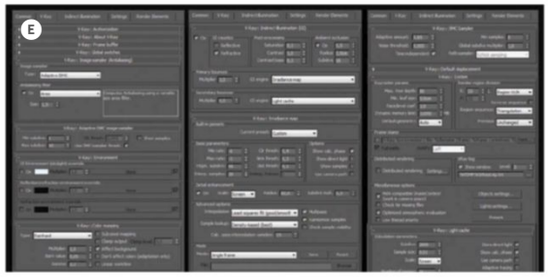
F Day scene screenshot inside Adobe After Effects. Post Production settings of the Main EXR file

03 Daylight – set up dome light

To create an interior daylight scene you'll need to place a VRayDomeLight outside and attach it to a VRaySun (see Problems and Solutions boxout). In the VRayDomeLight place the HDR inside the texture slot and tick "use texture". The HDR map itself is placed inside a Color Correction and desaturated slightly to -7 just to have a bit less yellow on the walls. VRayDomeLight intensity is set to 1,0 as well as the map output. For this daylight, we bought the HDR 1725 (day scene) from Peter Guthrie's collection at 3DOcean.net C.

04 How to set up daylight camera

The VRay camera near the table was placed behind a wall. Instead of moving the wall around we checked the clipping options in the camera (check the red line in the top view). In the VRay Camera Settings, the Depth of Field was enabled. We used an f-number of 4.0. Also Bokeh was enabled to have better DOF effects in the highlights. Vignetting was set to 1,0 and Color Balance to neutral D.

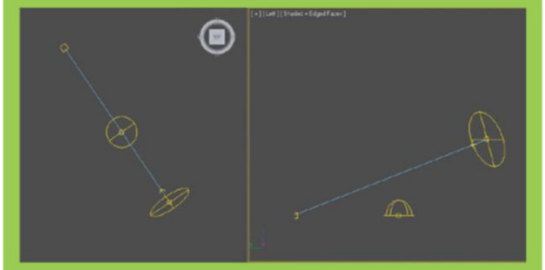


05 Set up daylight rendering

These are the VRay Camera Settings used for the daylight conditions. The big difference between these values and the night settings is that for the day situation we used Irradiance map (primary bounces) and Light Cache (secondary bounces) to calculate the Indirect Illumination (GI). While in the night shoot, Universal settings were used (check step number 14).

In this case, Detail Enhancement was turned on to boost for more detailed calculation during the rendering process. It's like turning on Brute Force when the computer starts rendering those corners and modelling details E.

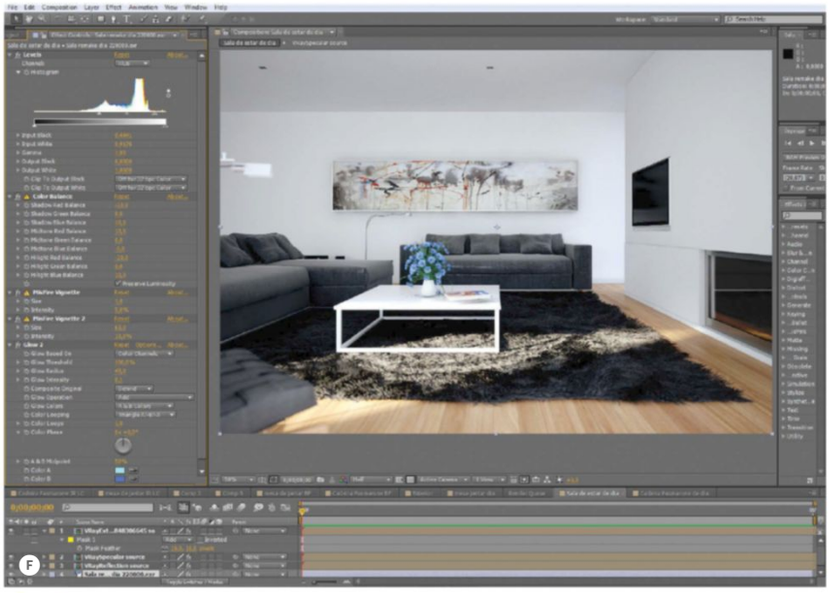
Problems and solutions



One solution that needs to be completed before any render testing is to know how to attach the VRaySun to the VRayDomeLight and its own HDR texture. This is so that when the VRaySun is rotated, the VRayDomeLight and HDR also rotates accordingly.

The VRaySun has to be at the same altitude (Z axis) of the light source of the HDR, or you will get double shadows. So, in order to achieve that, create a VRaySun and say yes to the VRaySky creation in the Environment slot. Align the VRaySun with the VRayDomeLight in the X, Y and Z axis. Afterwards turn off the VRayDomeLight. Place the VRay camera with f-number (16) in front of the VRaySun. Test till the VRaySun Z axis is exactly over the HDR light source. Link the VRayDomeLight to the HDR map using this code: radToDeg(Z_Rotation/360).

For further reading, check out the HDR video tutorial posted by Peter Guthrie on Vimeo.com.



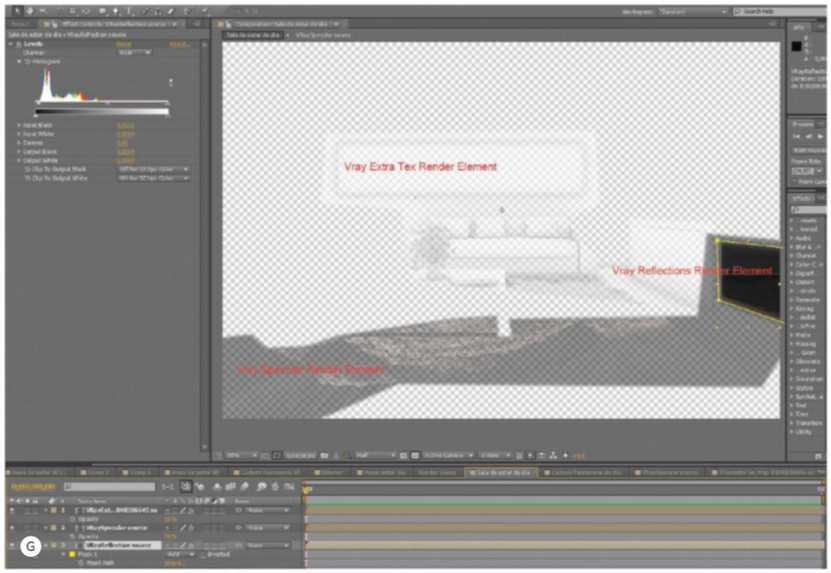
06 Day shoots postproduction

In order to get here, in the VRay Frame Buffer, inside the VRay Render Settings, tick the VRay Raw Image File box, and click on Browse. Save for an EXR 32-bit file. You can select multiply Render Elements, such as Reflections or Specular maps. Once your rendering is completed, they will be saved inside the EXR format. Afterwards open the EXR (you will need the ProEXR plugin) in the After Effects project folder.

All day images received a very similar Color Balance and extra Misfire Vignette (using Magic Bullet Looks). Only the Level settings varied a bit and the overall use of the Render Elements F.

Night lighting

Fire and lights for a new time of day

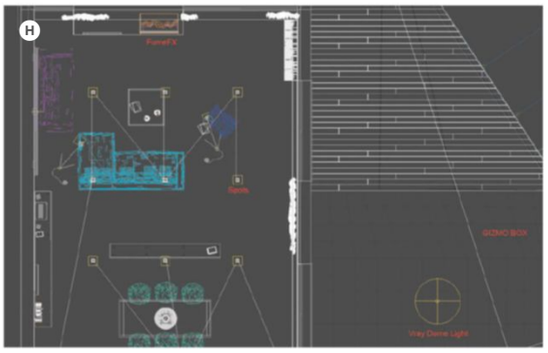


07 Tweaking render elements V-Ray will save all the desired Render Elements inside the EXR file. Once the EXR is in the After Effects project folder, select it and go to File. Select Create ProEXR Layer Comps. This way, all Render Elements will be extracted from your EXR file.

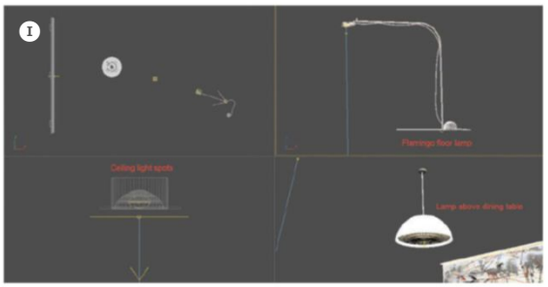
Place the new maps in the composition and start creating masks and play with feather and opacity settings. You can also use Color Correction effects such as Levels or Color Balance. For the Render Elements, we used them in multiply (ExtraTex) and screen mode (Reflections and Specular) in small particular areas where we want to enhance some detail or interest G.

Create a gas fire for the scene

Since, in our opinion, we didn't come up with great FumeFX results, in the next job we tried to do it in a faster and improved way. Visit the blog at www.metrocubicoblog.com to read the GasFireplace Tip tutorial where we basically cover the creation of a fireplace using an animated noise plane with a fire texture inside a VRayLightMaterial, while taking advantage of the VRay Camera Motion Blur. It worked and rendered pretty fast. Here's the result of this different work considering another different gas fireplace.



08 Night scene – set up dome light In the image here you can view the first night tests. In the end, it's all about the experience you have in terms of tweaking the VRay camera colour balance, the f-number, shutter speed, ISO values or lights. Each scene and camera settings vary. It all depends on the light conditions, where the camera is placed or what's happening around it. In this case, a VRayDomeLight with a HDRI 2003 map from the same collection was used, this time without VRaySun. IES and VRay lights for the spots and lamps were also used H.



09 Artificial lights setup The bottom object (horizontal cylinder) of the lamp above the dining table has a VRayLightMaterial with VRayDirt in the map channel. The Occluded colour is set into a dark yellowish and Normals were inverted. There is a VRaySphere inside the lamp with intensity 70,0 and temperature 4000 and a VRay IES below the lamp pointing down to the table with 180,0 of power and the same temperature. This was the same for all the ceiling spots and floor lamps I.

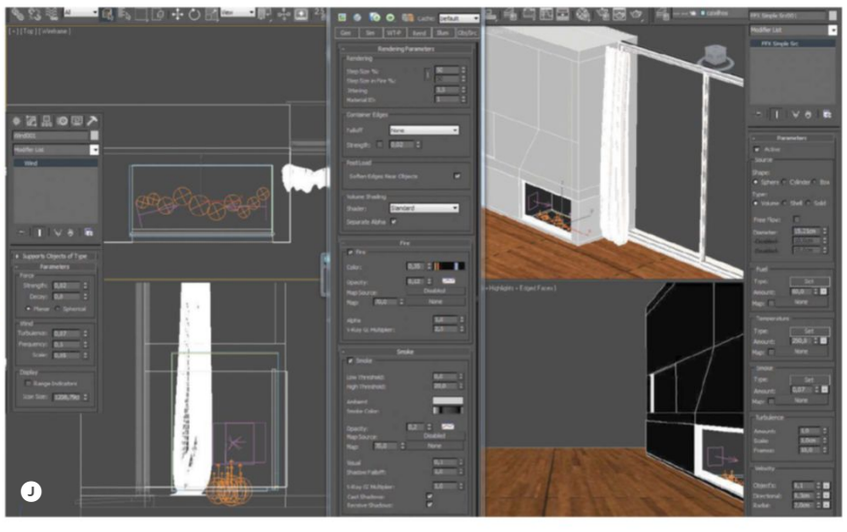
G Day scene inside After Effects. Postproduction settings of the Render Element Reflection map

H Rendering tests of the night conditions without materials. Overall setup inside 3ds Max

I 3ds Max screenshot of all the types of IES and VRay lights used for the night scene

J 3ds Max view of the fireplace, wind and FumeFX settings and testing

10 Basic FumeFX fireplace Realistic fire is not something we've tackled very often in our projects; nevertheless, we wanted to give the FumeFX plug-in a try in this particular scene. While we feel our final results could be improved upon [see boxout above], it has a nice effect on the light, metallic and floor surface materials J.



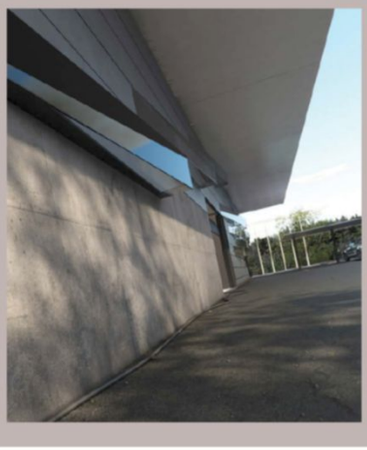
Artist showcase

Jacinto Monteiro

I was born in Oporto in 1978 and graduated in the Architecture University of Oporto (FAUP) in 2002. Six years of professional experience in the architectural and construction field gave me the basic knowledge to understand architects and their dreams. I have five years of experience in the 3D Digital World, divided up in several stages of my life.

Path to Knowledge - FAUP, Portugal **3ds Max, VRay, Photoshop and After Effects (2011)**
Architecture created by Álvaro Siza Vieira. FAUP library. One of the images of a personal work created specifically for the Evermotion Competition 2011 Interiors (it received second place). The digital artist could choose any interior space that inspired him.

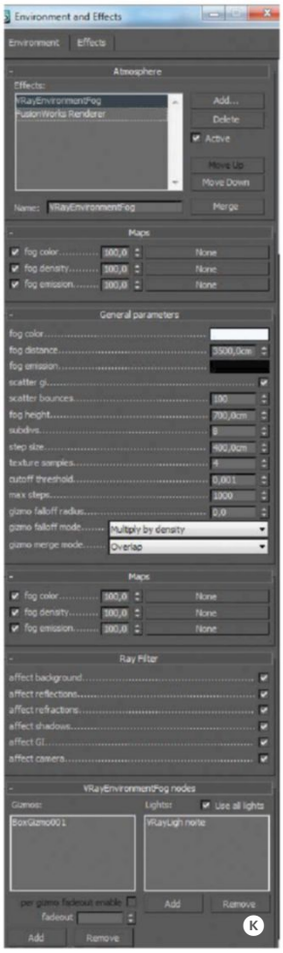
Golf Resort Lago do Manso, Brazil **3ds Max, VRay, Photoshop and After Effects (2010)**
Architecture created by About Blank Architecture (ABA). One of the images created for the Golf Resort Lago do Manso located in Brazil. In this case, the aerial shoot consisted of around 40 per cent photograph, 15 per cent Photoshop painting and 45 per cent 3D work. The MultiScatter plug-in was very helpful here too.



Detail view of Flux building **3ds Max, VRay, Photoshop (late 2009)**
Architecture created by Santos Godinho. Flux headquarters. This is one of my favourite images. I really can't say why. Maybe it's the angle of the camera, the hyper realism of it or the tiny detail (the cigar) waiting to be discovered.

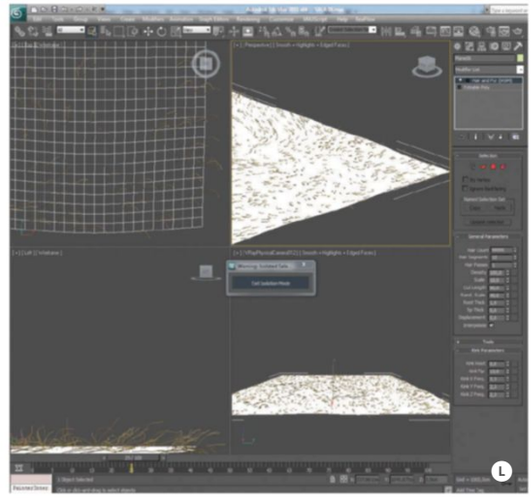
Extra details

Accessories and atmosphere

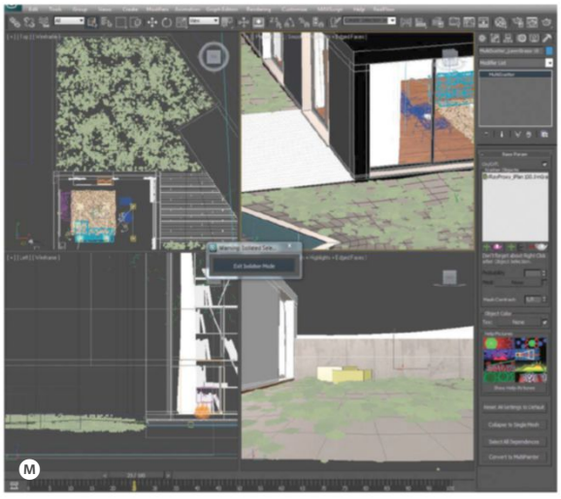


11 VRayEnvironmentFog easy setup We used EnvironmentFog to affect the overall light in the interior, making it brighter for inside or darker for outside. It also helps to limit the horizon of the viewer. The bigger the fog distance value the less it affects the scene – for the night scene we used 3000, while for the daylight shoots we turned everything off.

In the night scene, a Gizmo Box was created outside the house between incoming VRaySun. For VRayEnvironmentFog, open the Atmosphere Settings and add the desired effect. Select the Gizmo Box and the VRayDomeLight as nodes K.



12 Hair and Fur basic setup These next two steps cover extra details of the scene. The carpet is the first one. We created a plane and gave it a random noise. We then applied a Hair and Fur modifier to it and played with the options below. Afterwards we painted the hair using Styling options. A good tutorial on this matter was created by Pixela, and can be found on the Evermotion site in the Tutorials category L.



13 MultiScatter plug-in basic setup We converted small grass strand pieces (Igrass model) to VRayProxies, then distributed the object using MultiScatter in a noise plane using the settings shown in the screenshot.

While in the daylight setup we let the grass look bigger and continuous, in the night images we cut them a bit and left some pieces of the ground texture to appear more often, mostly because we wanted to have a more winter feel in the night scene. That's why we also used VRayEnvironmentFog, Fireplace and used trees without leaves M.

K A screenshot of the VRayEnvironmentFog settings

L Image of Carpet object and Hair and Fur settings in 3ds Max

M 3ds Max screenshot of the grass and MultiScatter settings

N Screenshot of all detail values regarding the V-Ray rendering settings in the night scene

O Screenshot of the image inside Magic Bullets Looks Builder – Adobe After Effects. Example of Spot exposure selected

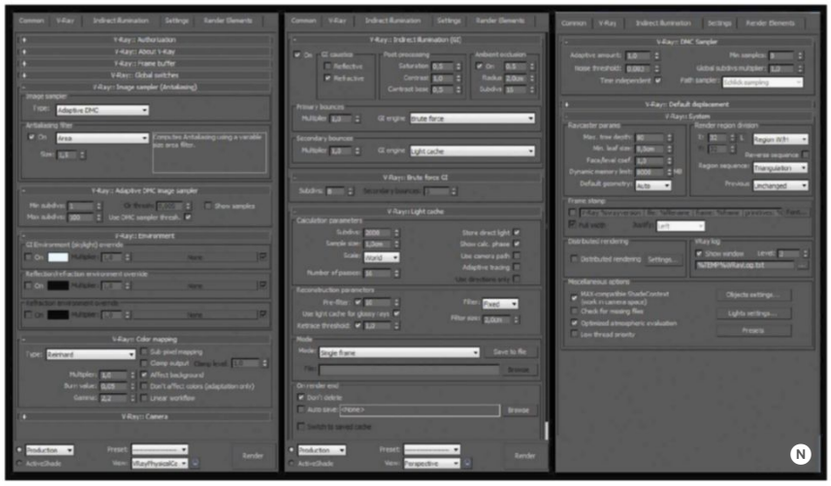
P Night scene image screenshot inside Adobe After Effects. Post Production settings of the main EXR file

Q Coffee smoke detail crop and a screenshot of the post production inside After Effects

Night scene continuation

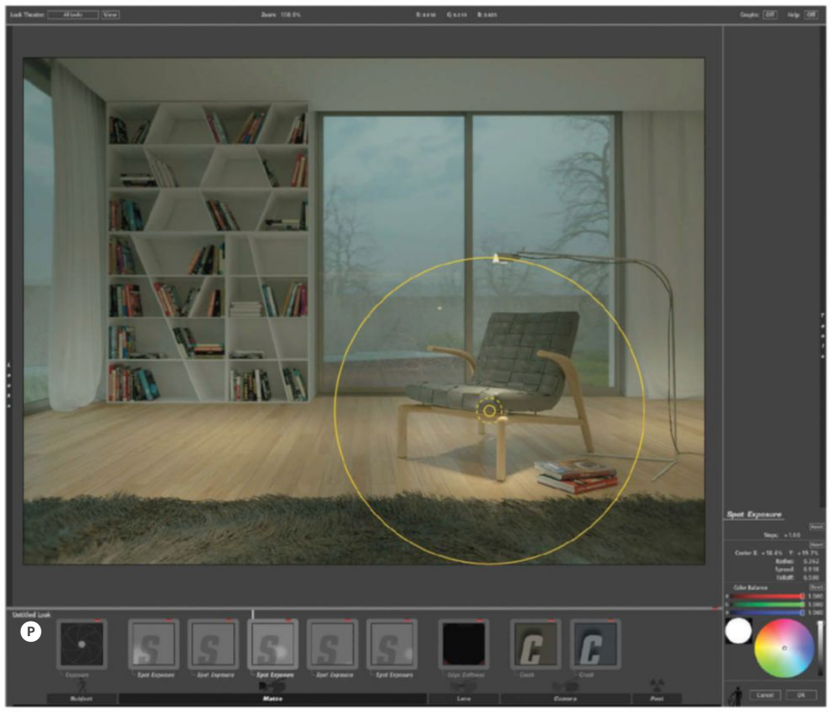
Rendering and postproduction of the night scene

4 hours per image render time Resolution: 2,500p largest size

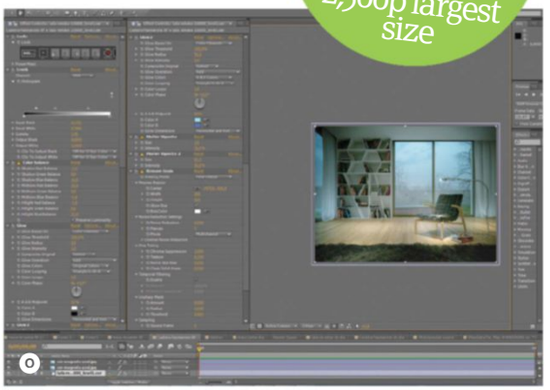


14 Set up night rendering For the night setup we used the common Universal Settings where Brute Force is used as primary bounce. Since there was time to render, we wanted to use Brute Force in order to have great rendered details. The DMC must be set to 100, and BF left in default, Light Cache for secondary bounces, adaptive amount of 1,0 and Noise Threshold of 0,003. Optimized Atmospheric Evaluation was ticked to have a faster render using VRayEnvironmentFog N.

> Magic Looks tuning, colour corrections, glows, and 32-bit post production resulted in a good colour balance and exposure light enhancement. The process needs a lot of testing and control

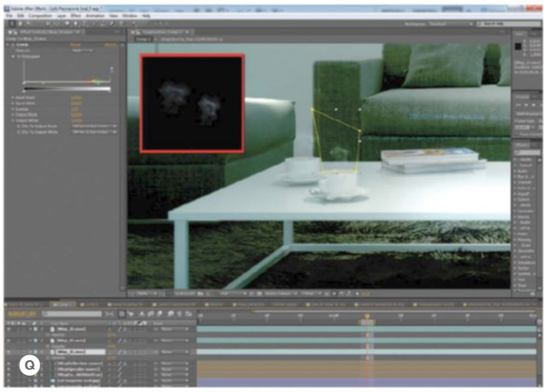


16 Night shoots main postproduction A combination of Magic Looks tuning, which we covered in the previous step, and colour corrections, glows, and 32-bit post production resulted in a good colour balance and exposure light enhancement. This way glows seem better but the overall process needs a lot of exposure testing and control P.



15 Magic Bullet Looks plug-in Inside After Effects, before starting the main postproduction, we opened the basic EXR image once again, and used the Magic Bullet Looks tool. In the Subject area we decreased the Exposure level to -1,25.

After all main postproduction was finished – colour correction, glows etc – we returned to the Looks tool and created some Spot Exposures as seen in the screenshot, made in interesting light areas of the image. We did this basic process for all the night version images O.



17 Coffee smoke detail In normal blending mode, we simply placed some smoke video (Action Essentials 2 from VideoCoPilot.net) with different scales above the coffee cups. Each one had different opacity settings (around 35% and 65%). Once completed in After Effects, we added the composition to the queue and re-rendered it, this time with all the postproduction in it Q.

Center Parcs – Woburn Forest 2010

> The brief for this image was simple: bring out the impeccable quality and uniqueness of the site at Woburn Forest

Mark Lee is a senior artist at Uniform

Modelling
Postproduction
Rendering

Software used in this piece

3ds Max | V-Ray | MultiScatter | Photoshop

Back to nature

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Mark Lee

3DArtistonline

Personal portfolio site
www.markandrewlee.co.uk

Country UK

Software used
3ds Max, V-Ray, MultiScatter, Photoshop

Expertise Mark leads high-budget architectural films and large-scale image projects for Uniform, working with some of the world's largest architectural practices. He specialises in VFX, postproduction effects, green-screen production and 3D animation

Concept

The idea for the image came from the architects, Holder Mathias (www.holdermathias.com). It was easy to compose the shot as the scheme sat on a beautiful lakeside with an equally enticing forest backdrop.

Center Parcs has four stunning locations in the UK, each set in acres of beautiful woodland with lakes and streams. When the company announced plans for a new Village in Bedfordshire, a set of images was needed to represent its designs and aspirations for the site. Being Center Parcs' single biggest investment to date, the imagery needed to communicate the vision and the quality of the Village in terms of the state-of-the-art facilities to a number of stakeholders at an early stage.

I ran the project at Uniform in Liverpool, and produced this image as the key 'money' shot to be used in various marketing materials and press releases. In this making-of, I'll run through the process of creating the work from initial concept to final postproduction, talking about some of the software and scripts I used and how the image generally came together.

The key to the success of this piece was the feeling of nature and blissful relaxation, so I made heavy use of 3D plants and trees. I'll show you my workflow for the work, including using VRayProxies, the brilliant MultiScatter, various Render Elements, and end up with a few postproduction techniques to achieve those picturesque yet believable arch-vis scenes.

Ⓐ The model I initially received from the architects

Building blocks

Pull together the concept and reference

01 Reference

The first step for any project I work on is finding reference imagery and creating a mood board showing the direction I'd like the image to go in. This mainly comes from the web, although we've got a large reference library at Uniform, which I always delve into as well. For this project though, being an image for Center Parcs, my main point of reference was the existing marketing material and brochure photography. The company sent me all its latest literature and within this were an abundance of stock of forests, lakes, existing Villages and, generally, families enjoying the woodland surroundings.

02 Quick montage

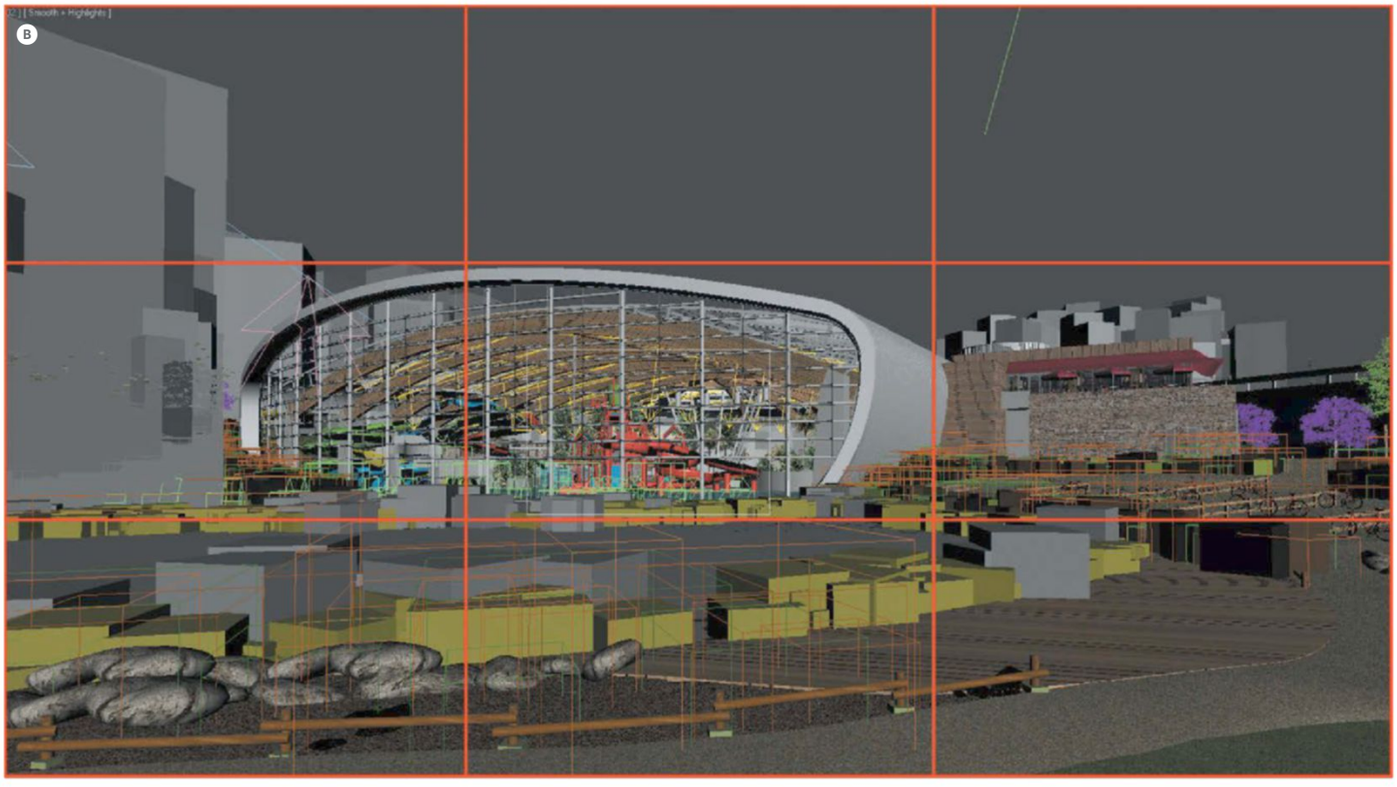
Once I was happy with my reference images and the style I was looking to achieve, I mocked up a quick montage image in Photoshop to show our creative director the kind of composition and overall effects I had in mind. This was a crude Copy and Paste job using a series of photos from our library such as trees, grass, water, etc, and a screengrab of the architect's model. It helped to illustrate what I wanted from the image and is always a good start for any architectural visualisation.

03 Architect's models

Traditionally, I would get a set of detailed architectural drawings from the client, import them into 3ds Max and model up the site from scratch. The trend I'm tending to see recently however is that a lot of architectural practices, such as Holder Mathias (the architects behind this project), are modelling up buildings themselves in SketchUp and sending us the models to work with. This way of working is great in the sense that I can get a full model into my scene and compose images and test lighting at an earlier stage, and also get a sense of what the building actually looks like. It also gives me more time to spend being 'creative' rather than modelling Ⓐ.

Production

Pulling the main image together



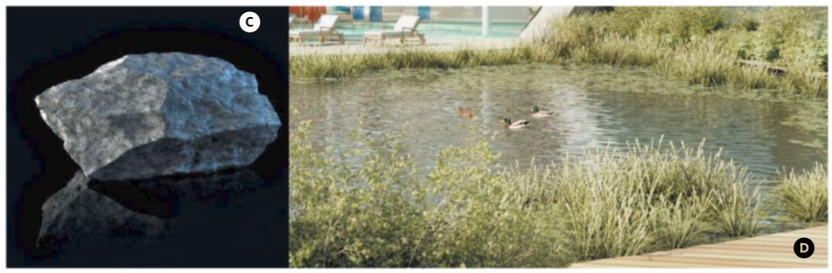
04 Composition

Each Center Parcs Village is set in a stunning location with beautiful forests and lake surroundings so I had the best possible starting point. I based my composition loosely around the age-old 'rule of thirds' giving the sky, forest/architecture and foreground equal space on screen, and splitting the image into bands of colour. I opted to make the trees to the left tallest at the edge of the screen and increasingly shorter as they move inwards, guiding your eye towards the architecture. From this angle, the curved façade of the pool would also give great reflections B.

05 Tidying the mesh

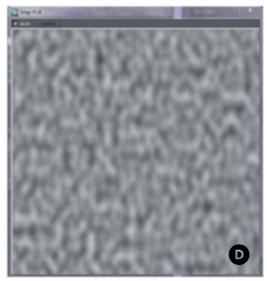
Although 3ds Max's SketchUp importer is much improved in 2010, there's still the problem of some flipped faces and coinciding meshes. As the workflow of modelling in SketchUp is different to that of Max, there will always be some work needed, and I ended up remodelling a lot of the scene so it would render properly. There's only a certain amount of flipping polys you can do before you end up just remodelling things from scratch instead!

> Each Center Parcs Village is set in a stunning location with beautiful forests and lake surroundings so I had the best possible starting point



06 Modelling details

To model the small rocks that add detail to the landscaping, I used a great script called Rock Generator that I found on ScriptSpot (**www.scriptspot.com**). I used the basic rock as a starting point and adjusted the size, shape and roughness to what I'd seen in some of my reference images. These were then scattered around in between larger smoother rocks that I'd recycled from a previous project C.



07 Landscaping

The topography information I got from the architects was quite blocky and stepped down to meet each spot height data, so I ended up remodelling this to create smooth contours. The rocks and small wooden railings in the foreground added a bit of extra detail and helped sit the bark chippings into the landscape.

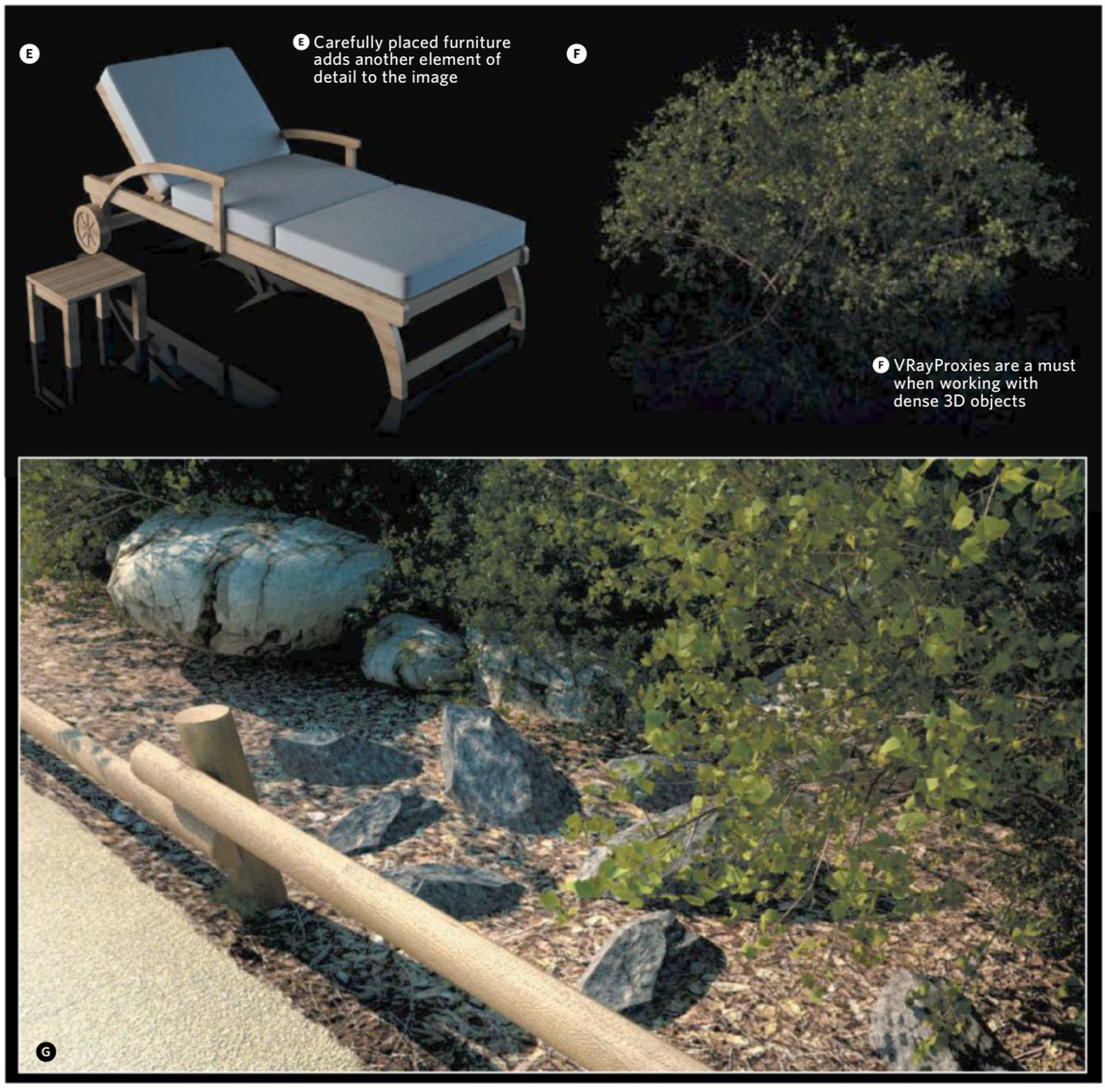
The water was a traditional Bump map applied with a reflective surface and, from this angle, I didn't feel the need to model anything under the water's surface, which I might if we were at a higher angle D.

Problems & solutions

One problem that always rears its ugly head is landscaping that isn't flat. If only the world was flat, my life would be a lot easier! We all know it isn't, so coping with sitting multiple objects onto varying heights of terrain can be tiresome without the necessary tools.

Two valuable scripts I used on this were the Pivot Placer and Planter scripts from the BlurScripts pack (www.neilblevins.com/blurscripts/blurscripts.htm). Pivot Placer enables you to select multiple objects and place their pivots – in this case, in the centre of the mesh in relation to X and Y and at the bottom point where they meet the ground on the Z axis.

Once I had this, Planter enables you to select a base object – ie my terrain – and it 'plants' all your objects onto the base so that their pivots are touching the surface. This meant that all my bike racks and bikes were flush to the ground and I didn't have to go round laboriously moving them until they all met the surface. This avoids any hovering objects!



E Carefully placed furniture adds another element of detail to the image

F VRayProxies are a must when working with dense 3D objects

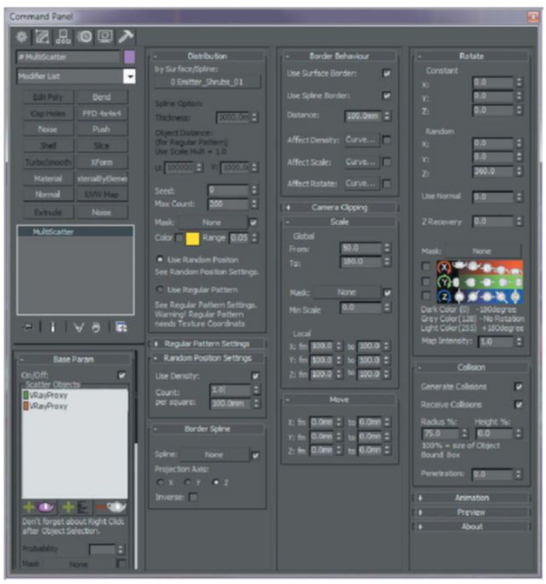
08 Furniture and internals

The furniture on the balcony terrace and outside the pool is all from our existing library of models at Uniform, as well as the bike model used in the bike park. The internals of the pool came from the architects and, combined with a few 3D trees and some water, gave a focal point for the image.

The internals of the upper level café were created by simply camera-mapping a plane with photographic images of existing cafés that were colour adjusted to the colour scheme of this one E.

09 VRayProxies

As with most foliage/trees in 3D, they tend to be made up of huge numbers of polygons and therefore eat up memory and slow your scene down. Converting my trees and bushes into individual VRayProxies meant they were only imported at render time and so didn't take up any unnecessary resources while working on the scene. A top tip when using a lot of proxies is to use Dynamic geometry in the System rollout in your V-Ray settings, and up the default limit value of 400MB to whatever your system can handle – in my case 6,500MB (based on 8GB of RAM). Don't forget about the Bounding Box mode to help your scene even further F.



G MultiScatter by iCube R&D is an important asset in my pipeline now

10 MultiScatter

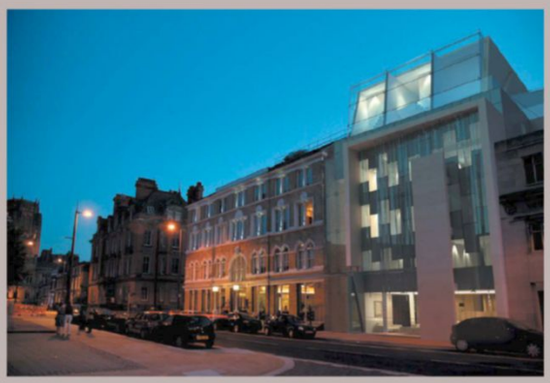
Although 3ds Max's new Object Paint tools are impressive, MultiScatter takes the notion of scattering objects to a whole new level.

I used VRayProxies for all of my bushes, rocks and trees and MultiScatter enabled me to place around 25,000 of them within the scene, each randomly rotated and scaled, with multiple textures for each type of object. I also created black-and-white maps to drive the location of the proxies in areas such as the lake for the lily pads. It also looked after collisions so I didn't have tree trunks intersecting with each other G.

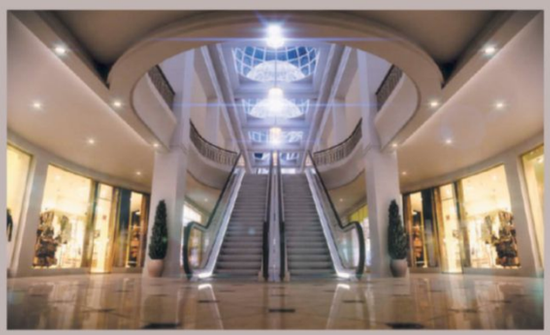
Artist showcase

Mark Lee

I studied Computer Animation at Teesside University, and have since moved into architectural visualisation, acquiring over four years of experience as a senior artist at Uniform, working with some of the largest architectural firms in the world. I lead and deliver high-budget films and large-scale image projects, specialising in VFX, postproduction, green-screen production and 3D animation.



Hope Street Hotel **3ds Max, V-Ray, Photoshop (2007)**
An older image, but still one of my favourites. This was created for a boutique hotel in Liverpool to show its new exclusive extension

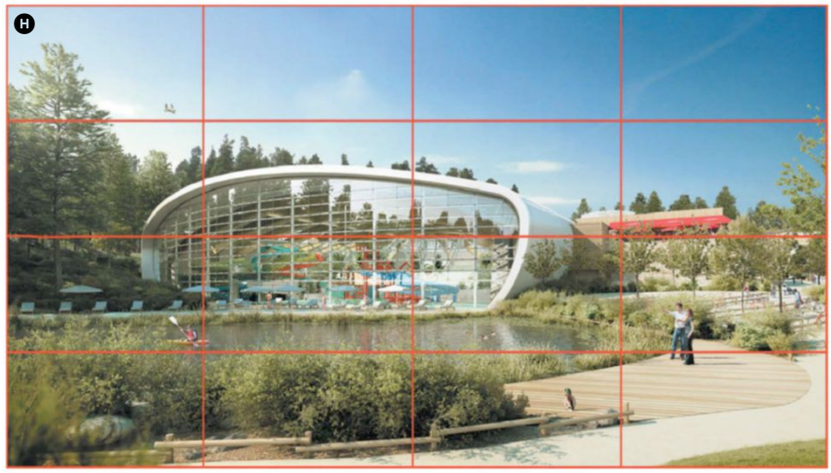


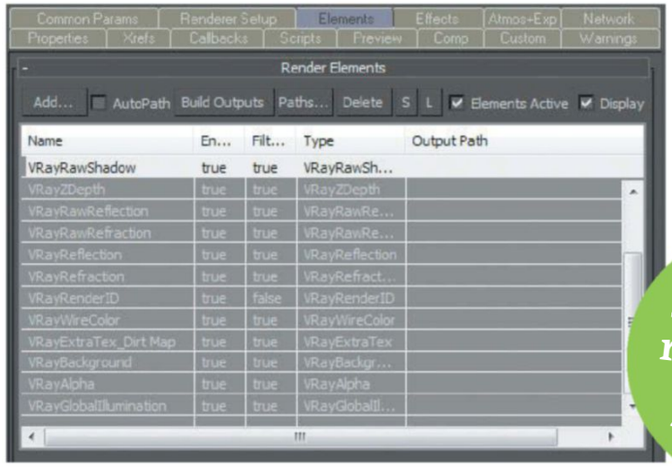
The Colosseum **3ds Max, V-Ray, Photoshop, Fusion (2009)**
This was a teaser film for Romania's largest shopping centre. On this shot I went to town with blings, glints and reflections to show off the quality of the materials used

Hermitage **3ds Max, V-Ray, Photoshop, Fusion (2010)**
This is a still from our latest film at Uniform. Hermitage Plaza's two towers will be the largest mixed-use towers in Western Europe at a staggering 323m! The film's premiere was seen by Vladimir Putin among others

Capturing nature

Lighting and rendering the heart of the forest





H Deadline by Prime Focus Software has become an integral part of my pipeline

I Here are the passes that I made use of for this image

2.5 hours render time
Resolution: 4,000 x 2,255

11 Lighting

I set up the lighting for the image with a standard VRaySun and Sky, combined with a VRayPhysicalCamera for correct camera exposure by tweaking the shutter speed and ISO. I used a slightly brighter version of the sky as a reflection override to boost the blues in the reflections of the main pool façade.

To boost the brightness of the pool internals I placed some large VRayLights in the ceiling, which bounced off the water and gave a bit more life to the pool and the slides.

12 Rendering

I started off rendering the image as a single render, but as the scene got more and more complicated, and the deadline got closer and closer, the render times for the image crept up meaning it wouldn't render in a single night. To get around this problem, I made use of the Tile Rendering option within Deadline (the render management software we use at Uniform, produced by Prime Focus Software). It meant I could split the image up into 16 equal chunks, and set it running on all the machines in our farm, reducing the overall render time drastically. Deadline also stitched the 16 images back together into a single EXR ready for me to update my Photoshop file **H**.

13 Render Elements

A huge advantage to using V-Ray and the OpenEXR file format is the ability to render out a series of elements effectively for free to help with the compositing of the image at a later date. You can see which elements I used in the image. VRayRawReflection helped to boost the reflections in the main pool glazing, and my new favourite element is VRayWireColor. By giving specific objects either a red, blue or green wire colour, and the rest of the scene black, you get free anti-aliased masks (unlike VRayRenderID) when brought back into Photoshop **I**.

Adding the polish

Hitting render is only the beginning! Into Photoshop we go…

Quick Mask

One of the most indispensable tools when producing still images is the Quick Mask script from ScriptSpot. If you haven't got the mask you need through any of the channels in your EXR, then this tool is a lifesaver. You simply select the object you want a mask of, hit Quick Mask and out pops a black-and-white image that you can drop into Photoshop as a mask. It also works with animations and, to speed things up, you can set it to Scanline for almost instant results.

Hard Light blending

A quick and easy way to add a bit of punch to your image is to make use of the Hard Light blending mode in Photoshop. My workflow is to duplicate the image and then turn it to black and white. I then add a Levels layer to this and increase the contrast quite a lot. Then simply turn the layer from the Normal blending mode to Hard Light and notice how much definition it adds to the image. This trick always looks great applied to grass in particular. If it makes certain parts too dark, just mask them out.

> The trees were a mixture of photographic 'architectural' trees on the right side of the image and 3D trees that make up the woodland on the left

14 Postproduction

As with a lot of my images, I try to get as much right in render as time permits, but more often than not, I tend to accelerate the image a great deal in Photoshop. As you can see here between my raw render and the final image, there's quite a lot of difference J.

15 People (and ducks)

Most of the people I used were from our library. Adam on the canoe, however, was shot specifically for this image with our Nikon D200, on location at Center Parcs. The ducks were added to embrace the nature theme and add a touch of humour; I've had a lot of great comments from peers about the ducks K!

16 Trees, grass and sky

As with most grass I put into images, I used a photograph and, with a grass-shaped brush, trimmed the edges in Photoshop. The sky was a photograph from our extensive library of skies, which I colour adjusted to match the grade of the image and lightened towards the left to show the direction of the sun; this is something which often gets overlooked. The trees were a mixture of photographic 'architectural' trees on the right of the image and 3D trees that make up the woodland on the left. I used a VRay2SidedMtl on the leaves to help the forest 'glow' L.

17 Final touches

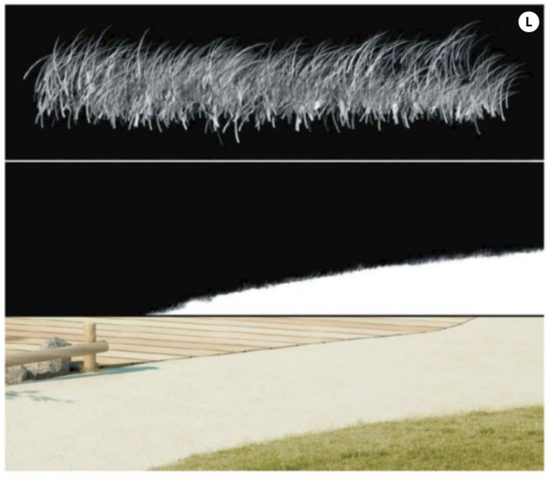
To complete the image, I added a blurred foreground bush to add a sense of depth, some overlaid shafts of light piercing through the trees and a few birds in the sky (to reinforce the nature theme). To enhance the believability and the photoreal effect I also used the Lens Correction tool in Photoshop to offset the Red/Cyan fringe to add a subtle touch of chromatic aberration. Lastly, I added a small vignette to darken the corners of the image M.

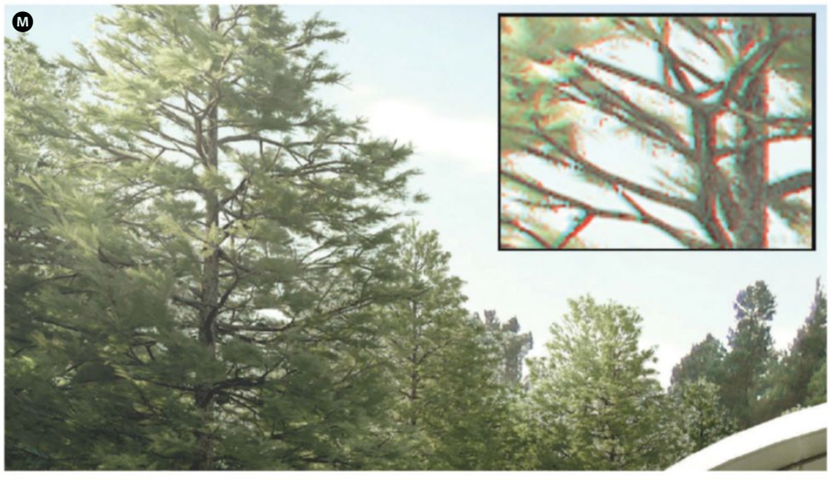
J A photorealistic sky always helps to sell the image. Here the foreground shrubbery also works well

K Shooting people in the intended locations always helps sell believability

L Photoshop grass brush – an old technique but it still works a treat!

M Chromatic aberration is a great way of adding that extra level of realism





Step by step

Easy-to-follow guides take you from concept to the final render

Creating realistic visualisations in Blender

Modern kitchen interior 2011

Artist info

Lech Sokołowski

3DArtistonline

Username: lechu

Personal portfolio site
www.no-triangle.com

Country Poland

Software used
Blender 2.61, Photoshop CS5

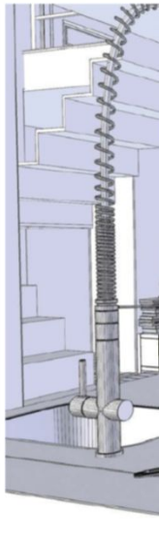
Expertise I consider myself as a 3D generalist. Although I specialise mostly in modelling, texturing and rendering, my real delight is animation, compositing and postproduction. In the past I've worked as a freelancer and 3D artist at the Evermotion Studio. I now run my own agency.

"In these steps I'll cover some basic techniques needed for creating realistic and good-looking interior visualisations using Blender"

Lech Sokołowski specialises in modelling, texturing and rendering

Over the next few pages we'll go through process of creating a realistic interior visualisation using Blender and Photoshop. We'll cover basic modelling techniques that are essential for using computer graphics in the arch-vis industry. We're also going to show you how to create realistic shaders and lighting setups using a new rendering engine that has been released for use with Blender. Focusing on image post-processing, we will share some tips and tricks with you that you'll hopefully find helpful in daily work.

The picture itself shows an apartment project that has been developed by my studio friends for an architectural competition. The topic was an adaptation of the old, industrial and unoccupied buildings for accommodation purposes. Our vision was to create a living space for young people, giving it both a modern and warm look, but still leaving some of the raw, concrete elements untouched. The design itself is rather simple and straightforward, but hopefully it's one you'll find pleasant and interesting. Let's now move to more practical part.



Source files available

PSD file with raw rendering and post – production layers.

Modelling, UV Mapping, Rendering

Software used in this piece

Blender Photoshop

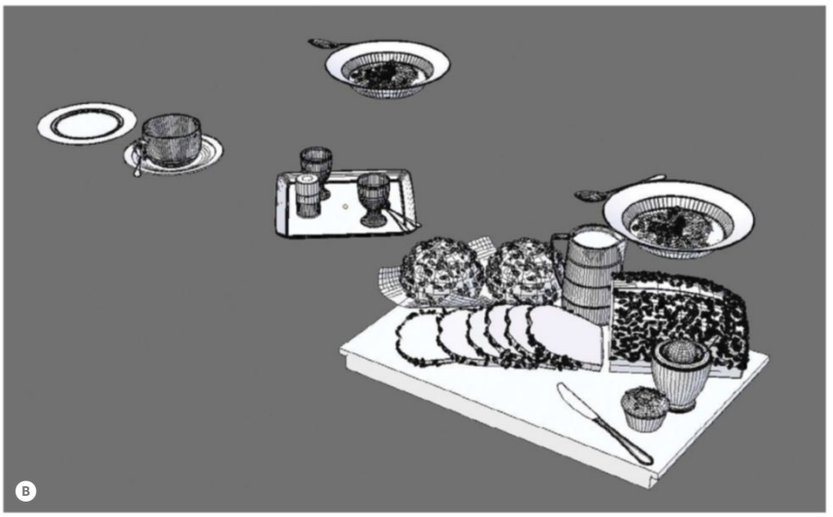
Concepts

Rough ideas to designing the model

A

01 Reference material

When working on interior or architectural visualisations in general, it's good to have a lot of different reference materials such as photographs of interesting buildings, design-focused books or magazines. They are very helpful when it comes to finding ideas on how to present and visualise your concepts or projects A.



B

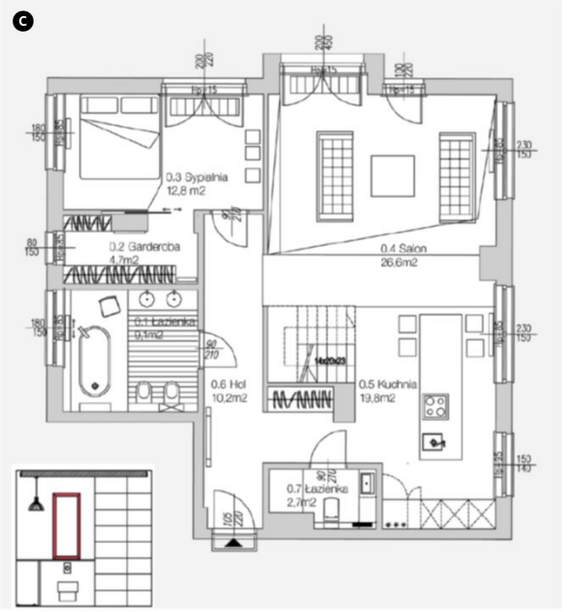
02 Detailed models

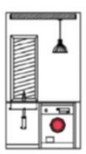
Build your own database of pre-made 3D models that can be quickly used in your projects. As it is commonly said "perfection lies in detail" and this also applies to computer graphics. A good, final result is very often a matter of little, tiny details that aren't so obvious if you place them in your scene, but it would be immediately apparent if you skipped them B.

03 Planning and preparing

Before you put your hands on the 3D geometry, study and acquaint yourself with the architectural drawings you've been provided. It's much easier to get the basic structure, such as windows and wall placement, right before tackling the more advanced stages of modelling. This nifty move will also save you time in the long run as it's less likely that you'll have to go back and redo or tweak elements of the room's structure C.

C





Artist showcase

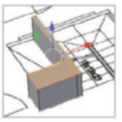
Lech Sokołowski

I'm an architect by education and 3D artist by passion. Since my youth I have been interested in various forms of artistic expression, especially drawing. My adventure with 3D graphics started during my studies and I've loved it ever since. Currently I run my own 3D graphics studio and live a happy life in a quiet, mellow region of Eastern Poland.

Eco Robot **Blender, Octane Render, Photoshop (2009)**
This is a conceptual robot that I prepared for one of the Blender competitions. I couldn't make it on time and the project lay unfinished for quite a while. I decided to give my concept a second life after the first version of Octane Render was released.

Canon 5D Mk. II **Blender, Octane Render, Photoshop (2010)**
I created this model while working in the Evermotion studio. The modelling process was quite challenging but at the same time very interesting and informative. The final image was created to experiment with studio-lighting techniques.

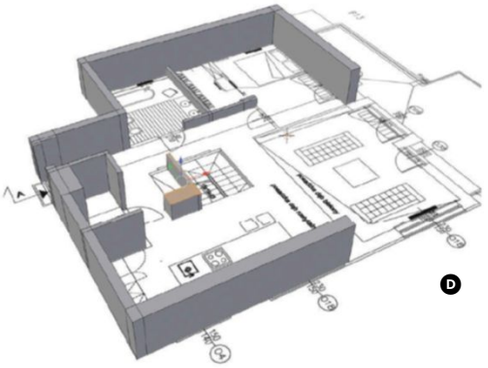
Falcon **Blender, After Effects (2011)**
Falcon is the model I made for a digital short movie directed by Jared Pelletier. It was built based on the conceptual drawings, later used by our studio for creating our own short animation.

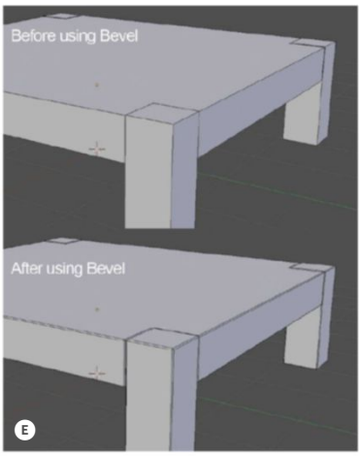


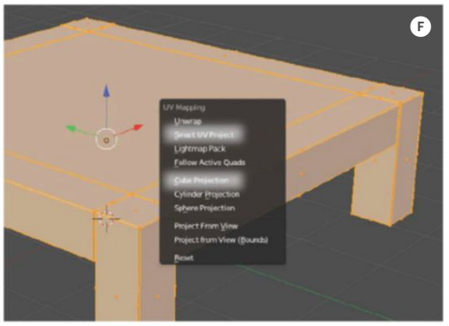
Scene preparation

How to build things quickly

04 Simple elements When preparing basic elements such as walls, slabs or ceilings, try to start from the most simple elements like cubes and later extrude them and modify according to the drawings. Try not to use Boolean types of modifiers for creating the openings – subdivide your mesh instead D.

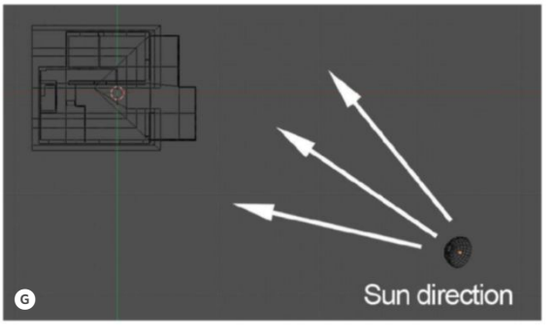






05 Furniture meshes Similar rules apply to the furniture models. Start from the basic meshes and then build the final shape. It's usually recommended to apply a Bevel type of modifier for softening the edges, making the model look more credible and natural E.

06 UV mapping made easy If you're not familiar with UV Mapping you can use Smart UV Project or Cube Projection options to unwrap your model for texturing (hit 'U' in Edit mode). Blender also enables you to use the Generated type of texture mapping which works fine with a far more uncomplicated geometry F.



07 Illuminating the scene To set up the illumination in your scene, apply a white, diffuse material to the whole geometry. Create basic light sources and add more emitters for enhancing the overall look. I've started by adding Sky Texture as the environmental lighting and a sphere object with emission material to simulate sun G.

08 Realistic window openings Next we need to create additional plane objects in window openings that would cast an extra light inside our interior. We've switched off their visibility to camera and also tweaked the glass material settings. The goal is to set up the scene properly, so it would both look realistic and still render reasonably fast H.

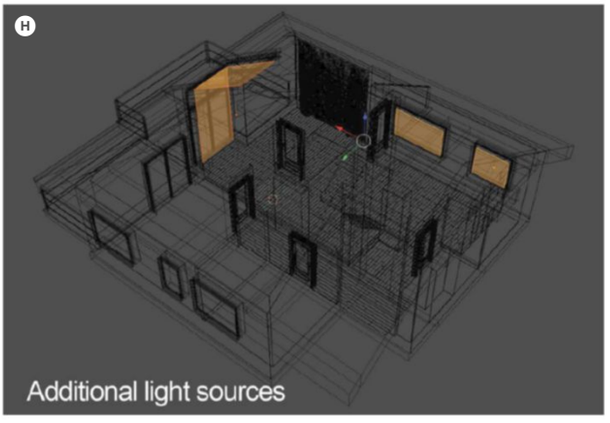
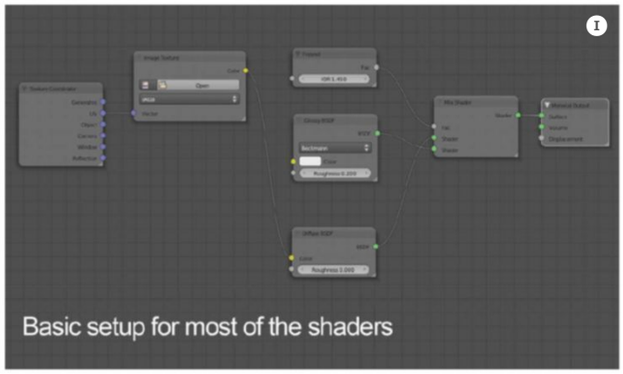
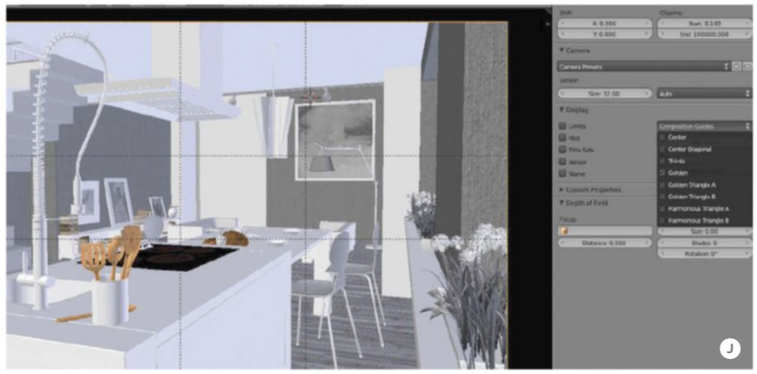


Image rendering

How to make it look real



09 Cycles rendering engine For creating the realistic images inside Blender you should use the Cycles rendering engine. It uses a Node-based system to create the shaders and materials. This may look a little bit complicated, but you should find it rather simple and intuitive I.



10 Setting a scene Camera placement and good image composition are essential when it comes to the final effect. Even the most realistic rendering will look boring if you miss this point. For example, make sure that there's always something visually interesting in the foreground, background and in the middle of the picture J.

11 Rendering options Cycles supports both CPU and GPU for renderings. Of course the GPU method is much faster, but it only supports Nvidia-based video cards. Keep in mind that you're also limited to your GPU RAM. The CPU method doesn't have this limitation but is also a far slower option K.

12 Unify the tones You can use both the Blender Node Editor or an external application for postproduction. It's best to start by unifying the tones and colours of the rendering. Emphasise the shadowed and highlighted areas, both adding the glow effect and slight desaturation L.

13 Finishing touches Last is giving the image two main tints – one in the highlights and one in the shadows. Increase the strength of the lights in your scene using simple brush and white colour. Adding the vignetting and slight chromatic aberration may also improve the final effect M.

Importing geometry to Blender

Most of the pre-made models that you find on the internet are prepared for various 3D applications like 3ds Max or Maya, for instance. Yet, many developers also provide the other file formats so you could use their products no matter what software you opt for. Blender currently supports all of the most popular file formats such as obj, fbx, collada, dxf or 3ds. Although it's not possible to import the materials, you still save a great amount of time that otherwise should be spent on modelling and UV mapping.

Design

From custom typography to abstract illustrations, develop your design style

170 Push the boundaries
Chris LaBrooy explains how

174 Fluid type experiment
Produce a dynamic piece of typography

178 Master abstract sculpture
Create a stunning surreal illustration

183 Gallery
By Krzysztof Gawel

184 Custom typography
Create hand-knitted, soft-looking lettering

188 ShadowBoxing with style
Blend a stylised character with abstract shapes

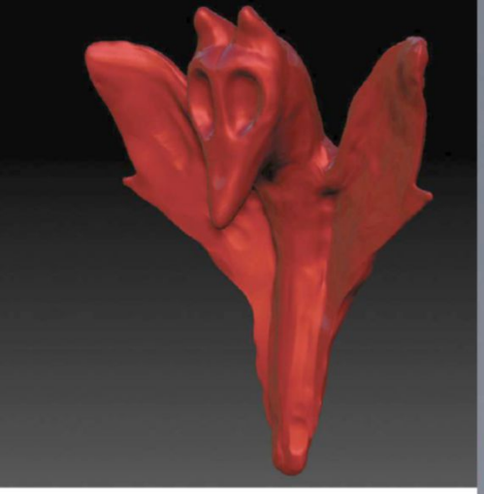
193 Gallery
By Kamil Solminski aka Trisme

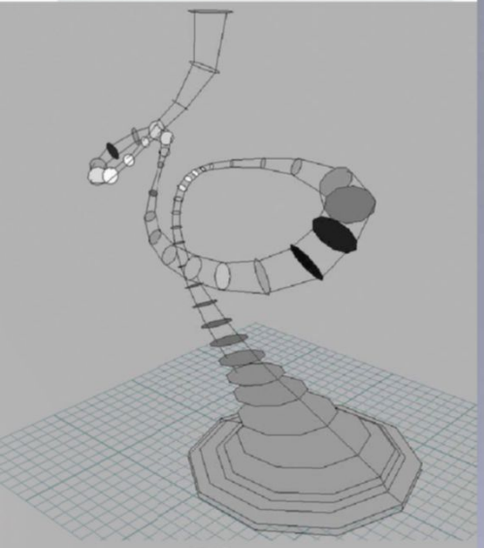
194 Digital graffiti
From 2D sketch to 3D art

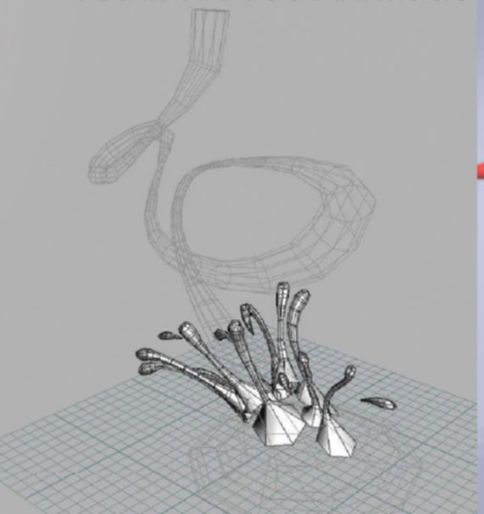
199 Gallery
By Finnian MacManus

200 Create fluid creatures
Turn solid objects into fluid creatures

205 I made this...
The Dark Type







> Combining the strengths of ZBrush and Houdini can achieve some quirky figurines

200

Name
Chris LaBrooy
Job title
Illustrator
Personal website
www.chrislabrooy.com

Push the boundaries

We catch up with experimental 3D artist Chris LaBrooy to find out more about him, his art and the lengths to which he'll go to avoid becoming typecast

Chris LaBrooy is best known for pushing the boundaries of typography in 3D. His vibrant and polished designs add a sense of originality to the words many of his works are based around – blending traditional 2D concepts with the power and flexibility of 3D. However, this Scottish product design graduate's path to the third dimension wasn't a direct route. In fact, up until he graduated from the Royal College of Art, he had never even touched a computer. "I never intentionally set out to do 3D," says Chris. "I started using it after college – I didn't have the resources to make things, so I'd use 3D to visualise ideas for products. I was using it as a practical tool, not really in a creative way."

To Chris, it was the evolution of his product design that developed into using it as a medium for art. "I've always worked on my own; I freelanced after college doing industrial design-type jobs." So he'd work with people who had ideas for products and create CAD models of them. While he admits it was "pretty boring stuff", it paid the bills and laid the path to more creative things.

Nowadays, Chris freelances for a variety of advertising agencies and other companies. Thus far he's produced work for Microsoft's Xbox 360, NatWest Bank, Airbus, Intel and French retailers to name just a few. While he's not permitted to discuss some of the projects, and many of them don't appear on his portfolio site, the work he did for Xbox will be out soon and he assures us it'll be "pretty cool".

Nevertheless, for Chris, it was really the typography that got him noticed in the industry. He says, "[The work] was really different and people hadn't seen that kind of thing before, which was good." His *Bauhaus* project was one of the most significant in this respect because it was the first to mix architecture with type, created as part of his personal portfolio. "Once I'd done that I realised [just how cool it was]. That kind of triggered other ideas; all subsequent pieces stemmed from that. It was the genesis... the seed."

What followed was a series of projects that continued to blend architecture or

All images © Chris LaBrooy

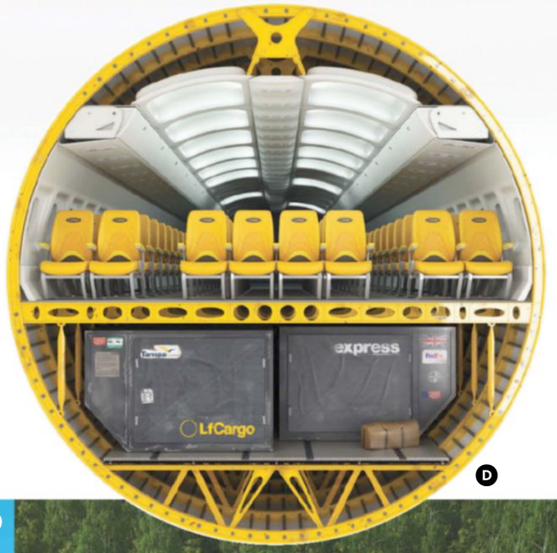
Letter forms inspired by Ettore Sottsass's furniture from the early Eighties

A

> "The best way to be inspired is by doing stuff. Work all the time and try [new things]"

B

- A Mini 3D model is by Gilles Tran, textures by Chris LaBrooy
- B An F1 illustration that tries to capture the essence of the event
- C A series of illustrations for the New York Summer Streets festival
- D Chris's contribution to the DixonBaxi Join The Dots projects



D

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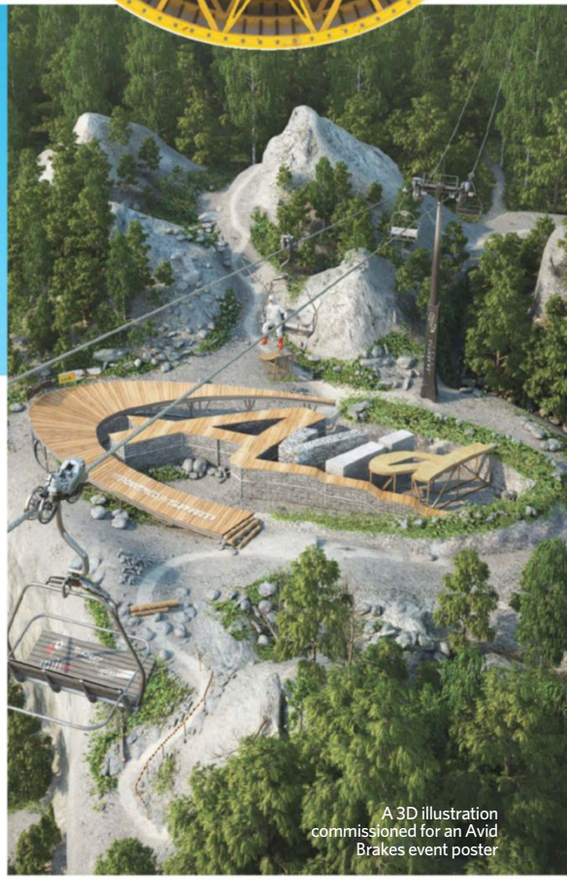


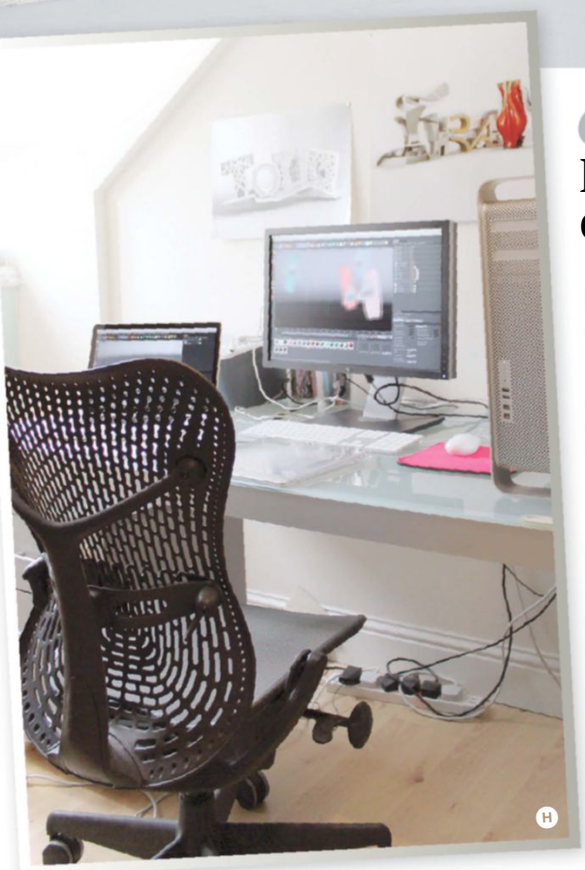
A 3D illustration commissioned for an Avid Brakes event poster

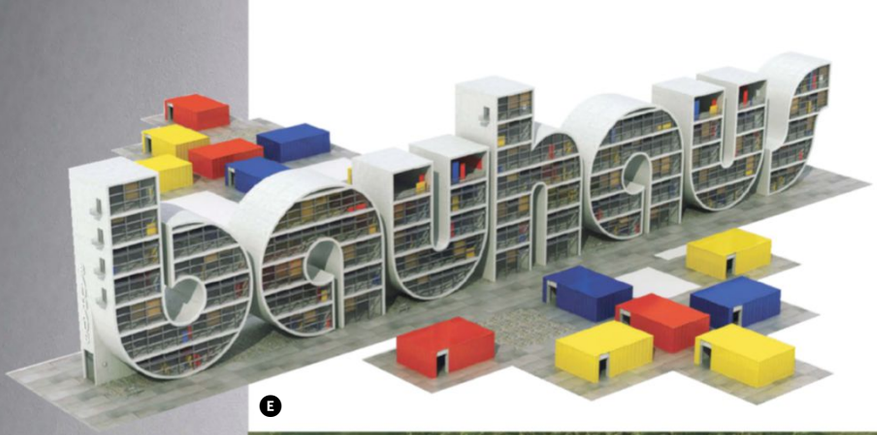
sculpting into the structure of typography. "The reason I like [this style] is because all the letters are in set shapes, so you've got a certain blueprint – everything's mapped out. You can just apply any style to it; architectural, organic, human – absolutely anything." He's certain there's nothing that cannot be turned into typography, noting the secret is "the way I approach it".

While, by his own admission, Chris doesn't believe he comes from a traditional graphics standpoint as such, this has proven beneficial in offering a new outlook on design and the way he tackles his artwork. "I like to think that brings a certain perspective to the graphics that I do. I've got a more distinct voice."

As you might have guessed, many of his influences are from industrial design and the field of architecture, such as Frank Gehry. Yet, he's a firm believer in exploring new styles off his own back too: "I always look at it that you should inspire yourself. The best way to be inspired is by doing stuff. Work all the time and try [new things]."

He certainly practises what he preaches, as this self-confessed workaholic never seems to stop. He rarely collaborates with other artists, which makes time one of the biggest challenges he faces. "I just work later [and do] longer hours – there's no way of getting around it really," he says matter of factly. "Sometimes I'll take on a few projects at a time; the most I've ever had at





E

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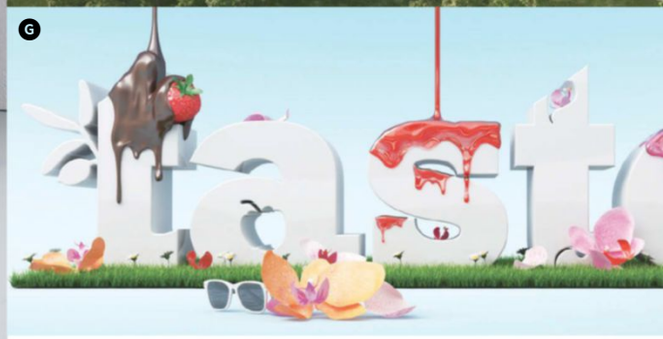


G

E *Bauhaus* was the first project to feature a mix of typography and arch vis

F The architecture of Tadao Ando served as a basis for this expressive type

G A 3D illustration created for the 2011 Taste Festival held in London, UK

H Chris's Herman Miller chair is a key item in his minimalist studio

> "For every project I have a test render folder… I'm always testing colours, lighting, shapes, composition – it's almost like photography"

the same time is three. I don't want to miss out on an opportunity. I hate having to turn work down."

This enthusiasm is reflected in both his art and his workflow. "When I get a new job I always get really excited about it and the old job gets finished as quickly as possible," he says. To begin he'll do a number of rough mockups in 3D. He goes on: "I might even use stock models just to do things quickly. I'll then [work up] a few ideas, evaluate and compare them, pick a direction and then delve into more details [through] modelling, texturing and whatnot."

While not all of the ideas will progress into the finished articles, that's not really the point of the exercise, as Chris says: "On my hard drive I've probably got hundreds of unfinished projects and ideas, etc – I always like sketching and trying things. Maybe one out of every ten will make it into a project. The whole idea is that you keep working and find inspiration by [actively] producing."

Something else he does a lot during the process of a project is rendering. "I do tons and tons of [it]," he reveals. "For every project I have a test render folder – it's probably got 200-plus images. I'm always testing colours, lighting, shapes, composition – it's almost like photography." All this is reliant on good hardware, as Chris explains: "It's something that's really important. Since I got my Mac Pro, the big workstation, it transformed the way I work. Because it's so powerful I can do a lot more tests, plus I can do things much quicker."

In terms of 3D software, Chris's education is mostly experimental trial and error mixed with a bit of online training. "When I first started I used the industrial programs like Rhino and AutoCAD. For the more

artistic side of things, I trialled all of them but found CINEMA 4D the easiest to use. I don't really read manuals – I just load [a program] up and see how far I get. In CINEMA 4D I got the furthest." Today the 3D software that forms part of his creative arsenal still includes CINEMA 4D, along with V-Ray and, from time to time, the sculpting application ZBrush.

Another tool of the trade Chris can't live without is his Wacom tablet. "It's invaluable," he asserts. "As soon as you start, you can't go back. I can't use a mouse any more – I can only use my Wacom." Something else that's vital to his daily workflow is a Herman Miller chair: "If you're going to sit in a chair all day, get the very best you can [afford]," Chris advises. "[My Herman Miller] is probably one of the most important things in my studio. It means I can sit there for four hours at a time, easy."

That chair certainly gets a fair amount of use too, because thankfully the recession hasn't impacted on his number of commissions – quite the opposite, in fact: "I've never been busier – it's kind of strange. I guess the reason why I'm lucky is because the stuff I'm doing is new. That's ultimately what [is in demand]."

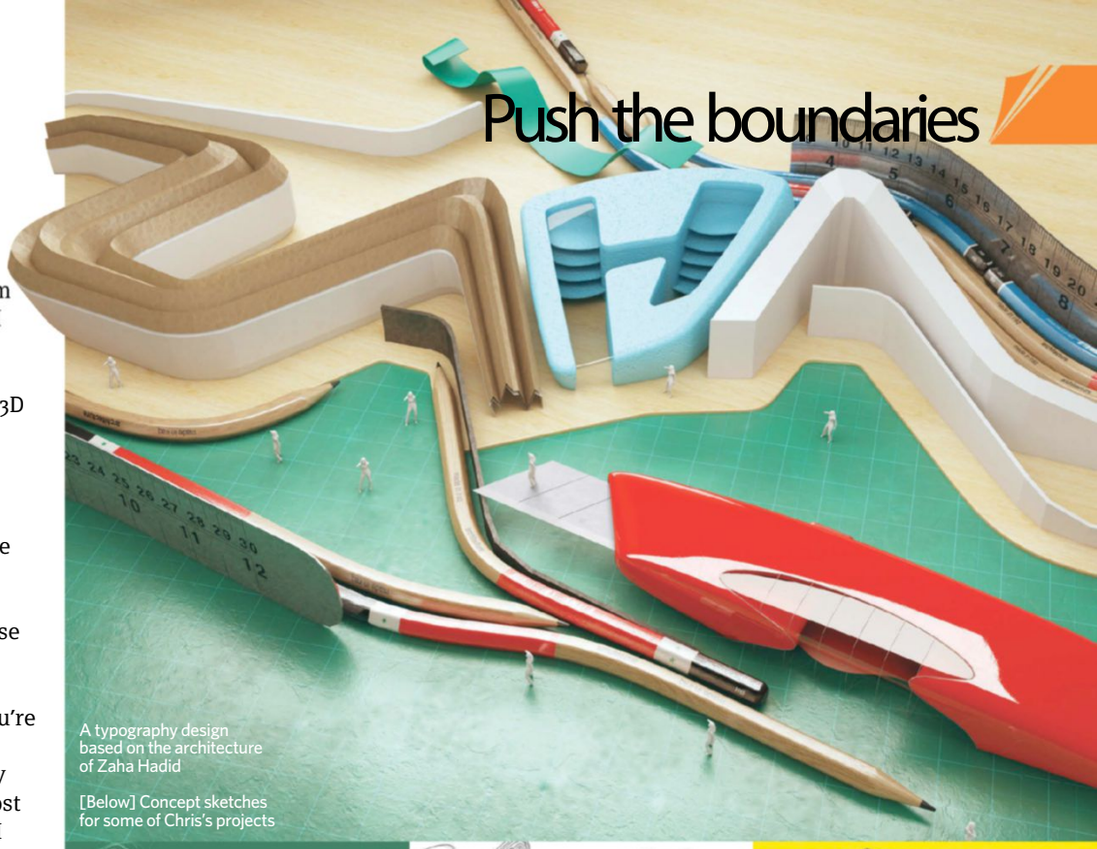
So now that he's established a firm portfolio base, what's next? "Now I'm thinking I've got to find a new style to apply to something. It might be motion graphics or more types of animation, because [apart from the *Cross-fire* project] I've not really done any of that. So I need to find a unique perspective in the animation space."

Seeking out a niche style in 3D has definitely proven successful for this artist, and it's something he'd recommend fellow designers to do when seeking employment within this competitive industry. "You've got to find your own unique [take] on something and then do a lot of it. If it's good enough, it'll draw attention to itself – that's a cool way to approach it."

He continues: "My whole approach is to make the best of what you can possibly make." One way in which to do that is by showcasing yourself to the rest of the industry and your peers. "My portfolio is the most important thing to me – I'm quite precious about it. Some of the projects I've done don't go in the portfolio because I don't think they'll necessarily contribute anything. You just have to reserve your portfolio for the best stuff."

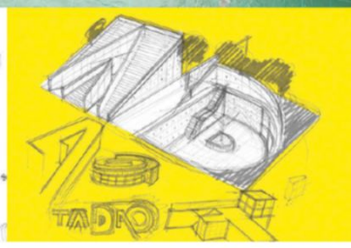
As for the future, Chris remains modest yet focused about his ambitions. "At the moment it's just a case of trying to maintain the momentum that I have," he says, "so I'll keep working, keep trying new stuff and hopefully cool jobs will come my way."

Push the boundaries



A typography design based on the architecture of Zaha Hadid

[Below] Concept sketches for some of Chris's projects



Caught up in Cross-fire

A closer look at this mixed-media collaboration project

Chris teamed up with friend and director Geoffrey Mann to blend rapid prototyping with animation and soundwaves. Chris modelled a dining scene then proceeded to animate the crockery and cutlery to link up and deform to correspond with the soundwaves from an audio sample taken from the film *American Beauty*.

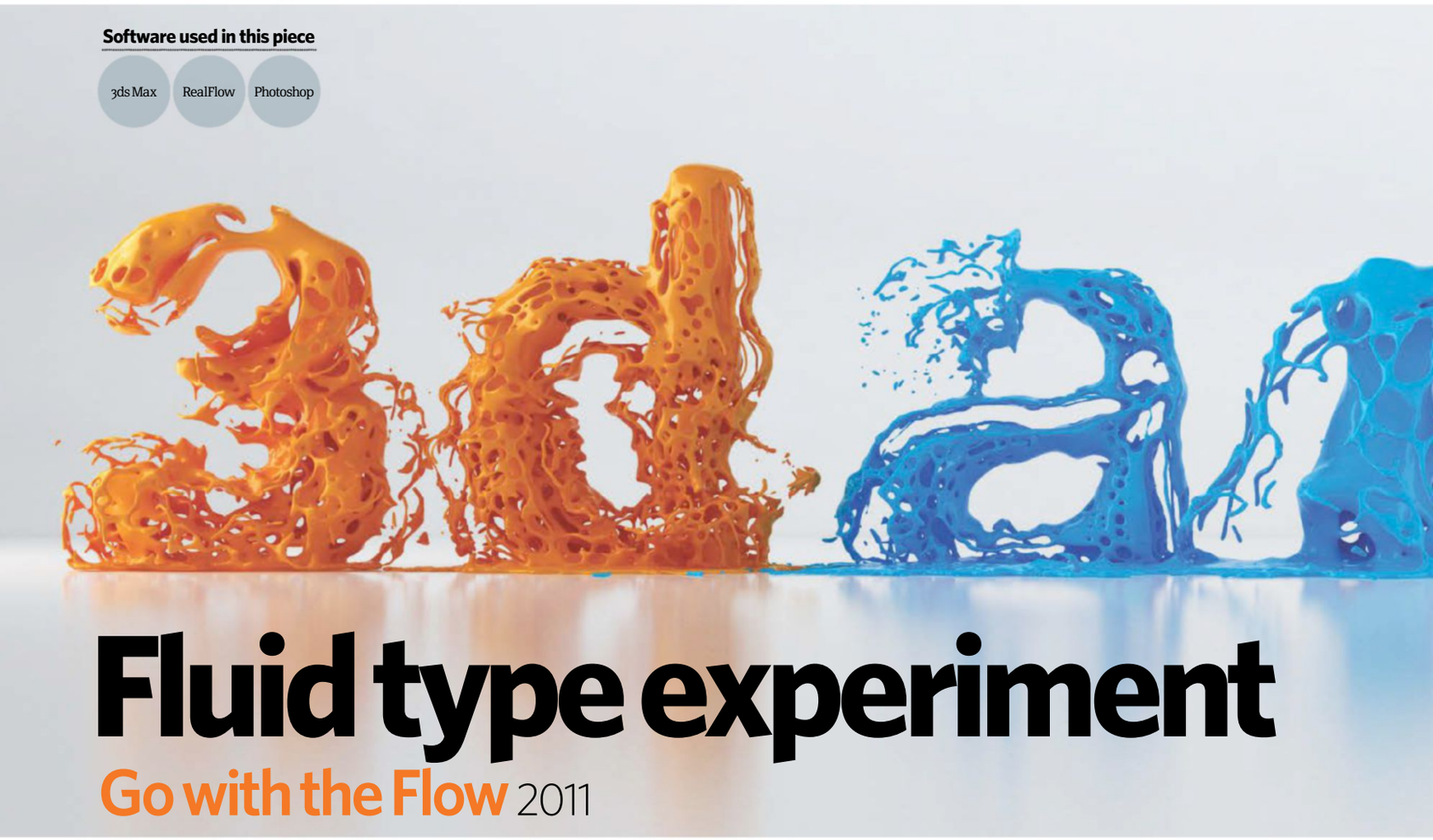
Chris's interpretation of the soundwave files in relation to the items on the table mean they influence the visuals and animation. According to Geoffrey, the aim of the *Cross-fire* project was to "examine the intangible characteristic of the spoken word and investigate the unseen effect of sound upon its inhabited environment."

Once they had finished the animation, the two artists did a freeze frame and exported the models. All the objects that featured in the scene underwent a process of rapid prototyping (more commonly known as 3D printing) and were turned into real-world objects made out of ceramics, glass and silver. "It's an interesting animation project in terms of how it manifests itself into actual physical things," comments Chris.

Cross-fire will be exhibited at the Museum of Modern Art (MoMA) in New York throughout the summer, but if you'd like to watch the animation right now then visit **www.mrmann.co.uk/cross-fire.html**.

Software used in this piece

3ds Max | RealFlow | Photoshop



Fluid type experiment

Go with the Flow 2011

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Hussain Almossawi

3DArtistonline

Username: mossawi09

Personal portfolio site
www.skyrill.com

Country Bahrain

Software used
3ds Max, RealFlow, Photoshop

Expertise Hussain is still dipping his toe into the vast possibilities of 3D. He specialises in interiors and vehicles and is currently moving more into visual effects and character modelling.

> In this experimental work, Skyrill.com pulls together tools from a trio of powerful programs to produce a dynamic piece of typography that almost explodes off the page
>
> **Hussain Almossawi** 3D artist

This tutorial will guide you through the various techniques used to create this fluid type experiment. The project spans over three different programs, but mainly focuses on the fluid-dynamics program RealFlow. This software is an essential tool for designers working with visual effects and anything that contains particles or various collisions and dynamics. The physics and tools in this program enable you to do a multitude of effects. We will look at how the letters were made out of particles, and later how these were exploded and liquidised. After finalising the fluids we'll show how the materials and lighting were set up.

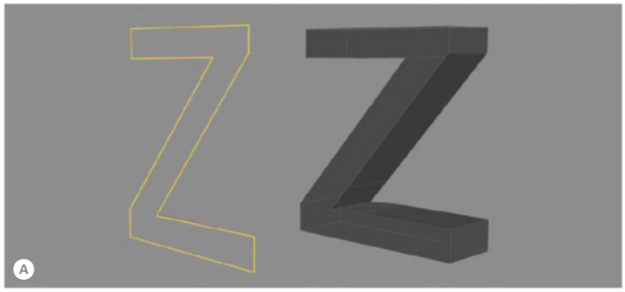
In this tutorial, you can use any 3D software of your choice, but we will be showing our workflow through 3ds Max, before moving into Photoshop for postproduction. The render engine used was V-Ray, but once again this is a matter of personal preference. Four clips of the process are provided as part of your source files; meanwhile, the final videos of the letter animations are on **www.skyrill.com**.

Begin your type adventure

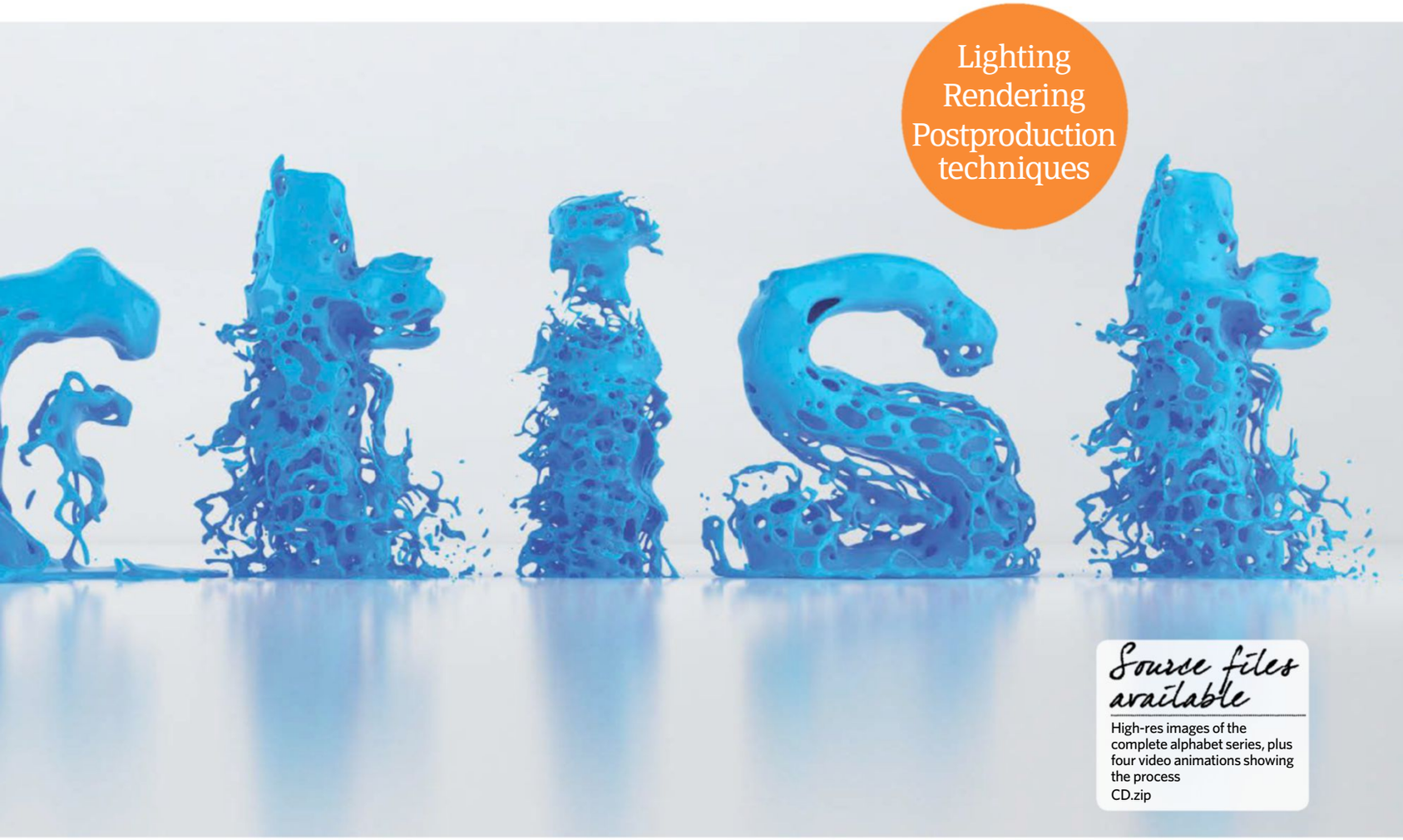
Create the letters and prepare initial shapes

01 Create the letters

Start by writing out your letters in the 3D software of your choice. We will be using 3ds Max. Take some time to decide which typeface you're going to use because each font could lead to very different results based on the size and shapes of each character. Once you are happy with your letters, apply the Extrude modifier to give them some depth. This will now serve as a container that will form the basic shape of our fluid A.

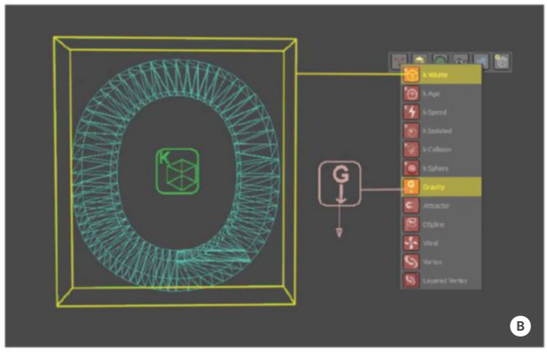


Lighting
Rendering
Postproduction
techniques



Source files available

High-res images of the complete alphabet series, plus four video animations showing the process
CD.zip



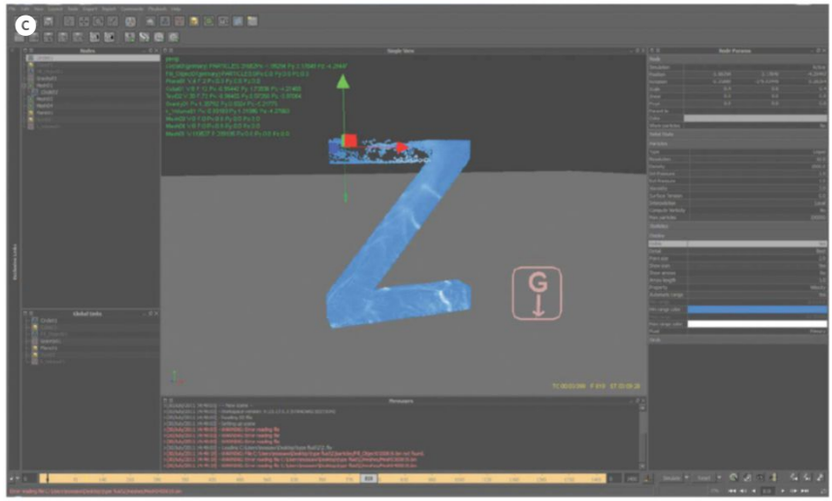
B

02 Setup in RealFlow

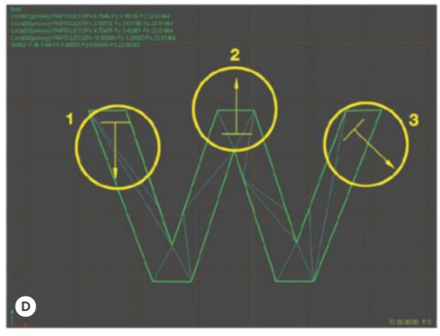
Taking one character at a time, import your letter into RealFlow, and start by making sure you aren't working on a small or large scale. Insert a Kill Volume daemon around the letter to avoid any particles leaking out of the letter shell; this will guarantee a faster simulation time. Also insert a Gravity daemon into the scene. You can start with a value of 5 then toggle it up and down throughout the scene to create some variation B.

03 Form the letter

Place an emitter inside of the letter and fill it up by 80-90%. The speed of your emitter will seriously affect how the final piece will look. For this reason, it's important to closely study how the particles interact with one another, based on the speed and the angles at which they bounce off the walls of the letter, etc C.



C



D

04 Working with bigger characters

Some letters are much wider, or longer compared to others – for example, the 'm' versus the 'I'. Adding a single emitter would not fill each shape up evenly. Therefore, you will sometimes need to add two emitters, or sometimes even repeat them in order to fill a particular character. You will also need to play with the speed and scale values D.

A close look at fluids

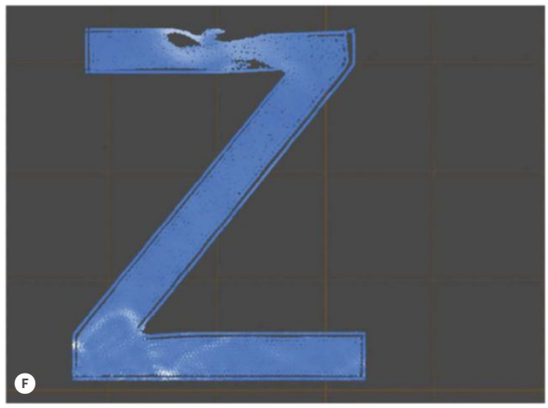
Working with particles in RealFlow

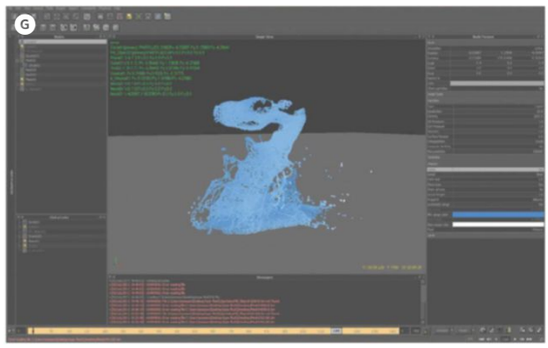
05 Build up pressure

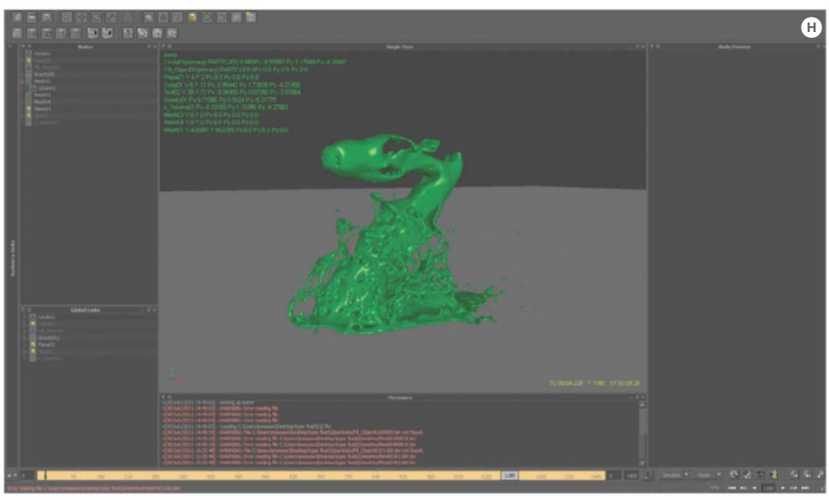
As your letters are filling up with particles, toggle the settings for the Internal and External pressure levels on the emitters. Increasing and decreasing the pressure levels lends some inconsistency to the particles and generally builds high-pressure levels. This will result in a more dramatic explosion and splash effect once we reach the later steps E.

06 Go with the flow

Once a letter has filled up, turn your emitter(s) to a speed of 0 to stop it/them from running, and just let it simulate as the particles keep flowing through your letter. You can distinguish the high-pressure points and low-pressure points by the brightness of the particles; the brighter the particles, the higher the pressure, and vice versa. Our particle count is about 30,000 particles. Letting the particles flow through the letter gives you lots of options for the next steps, depending on where the pressure points are at the time you release the particles F.







07 Release the particles

When you are satisfied with the particles, and they seem evenly spread, go to the original letter object, and in the Node panel, select Deactivate. Also turn off the Kill Volume daemon, and start simulating from the frame you are most satisfied with. Your particles should now be set free and seem as if exploding in free space. Let the simulation run until you find a frame that best captures what you are looking to achieve G.

08 Add the mesh

To add a mesh to particles, begin by applying it to one frame. Once satisfied, apply it to the whole animation. The most important settings we tweaked here were the Polygon Size, which was set to a low value and the Filters which were activated. Also, in the Field Settings, set the Blend Factor high and the Radius Size fairly low. There will probably need to be a lot of trial and error before you are happy so take your time when tweaking these parameters H.

Artist Showcase

Hussain Almossawi

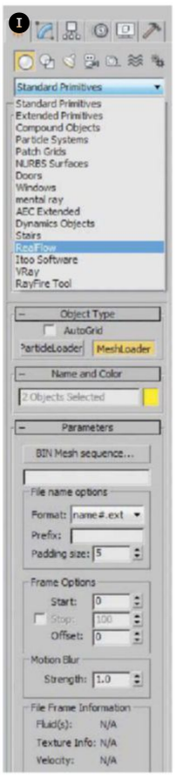
I am 23 years old with lots of passion for 3D. I always try to keep an eye on work being created by others; that's what inspires me and makes me want to move on and explore all kinds of different things in the 3D world. I run Skyrill.com along with my brother Ali.

Astrum Meera **3ds Max, V-Ray, Photoshop (2010)**
Astrum is the Latin word for 'star'. The Astrum Meera is a proposed concept car, the second in its series, possessing several distinctive features that play a unique role in safety, sustainability and practical design.

Tivoli Audio **3ds Max, Photoshop (2010)**
Tivoli Audio was celebrating its tenth anniversary and invited designers to participate in designing its next ad. The type was created in 3D and then brought into Photoshop, where the other elements were designed.

Postproduction tips

Add those finishing touches



09 Importing back to 3ds Max

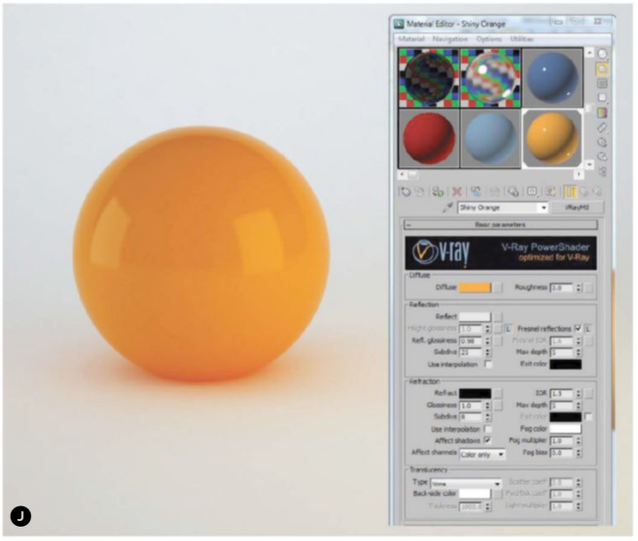
We will now import the mesh we created into 3ds Max. Go to the dropdown menu under Create and choose the RealFlow plug-in. Select MeshLoader and place it in your scene. In the plug-in options click on Bin Mesh sequence, and select where your mesh files were saved from RealFlow. This will now load the whole meshed animation and you can choose the frame from the animation bar I.

10 Material settings

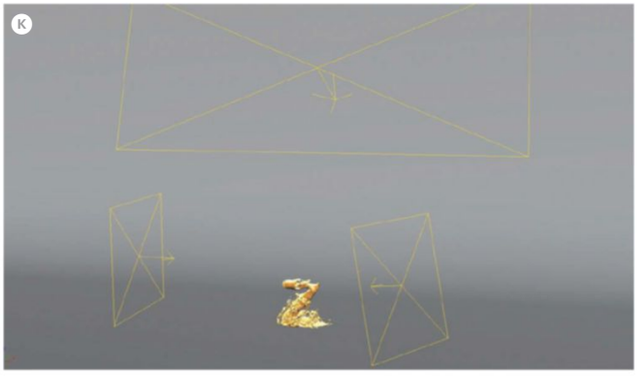
The shiny plastic material is a simple VRayMtl that will require a few tweaks in order to get a good reflection. The settings are as follows: Diffuse Color 17,244,239, Reflect 200, Fresnel Reflection is On, Reflection Glossiness 0.98, Subdivs 25. We also explored some other materials that might work, such as wood, chrome, honey and other foodstuffs. Sample a few until you get a finish that you're happy with J.

11 Add lighting

Three VRayLights were added to this work – one to the left, one to the right, and one above that covered the whole scene. The left light has a light blue tint to it with an Intensity of 10. The right light has a light yellow hue, also with an Intensity of 10. The top light is a sky blue colour with an intensity of 10. The three differing tones of light blended together to give the scene a nice, balanced harmony K.



J



K

Customise the letters

When filling up the letters with particles, you might find some issues with some of the characters because of their shape. If this occurs, the letter needs to be converted into editable polys or splines for its shape to be tweaked. For example, the letters 'f' and 't' have a really small horizontal line crossing through them, and when the letter explodes these lines almost disappear. To rectify this, we over-emphasised these strokes by extending them. Depending on your typeface, the same may go for larger letters such as 'g', 'm' and 'w'. Editing them and tweaking the characters can make the final outcome look much more clean and even.

12 Refine the letters

Now it's over to Photoshop for the finishing touches. Using the Clone and Pen tools, new fluid shapes were drawn out in various sizes and blended with the original letters to make the splash effect look more natural. The Burn tool was also used to give a shiny edge to some of the new particles L.

L

Roche Bobois interior **3ds Max, V-Ray, Photoshop (2011)**
This was a personal project based on the Roche Bobois Interiors catalogue. I wanted to study the different lighting and rendering techniques to match the original photograph. I am really inspired by these interiors.

M

13 Final postproduction

Colour and lighting adjustments were also done in Photoshop using the Color Balance adjustment layer and the Curves option. The final image is made up of different layers put together using a range of blending modes including Screen, Overlay and Soft Light. You can also adjust the opacity levels of each layer to get more striking results, but this is an optional extra M.

Modelling
Compositing

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Tomasz Opasinski

3DArtist online

Personal portfolio site
www.tomasz-opasinski.com

Country Born in Poland, currently lives in the USA

Software used
CINEMA 4D, Photoshop CS5

Expertise Tomasz specialises in entertainment advertising with an emphasis on movie posters and videogames. As far as 3D goes, he mainly uses CINEMA 4D and ZBrush

Software used in this piece

CINEMA 4D | Photoshop

Master abstract sculpture

Flynn's World 2011

> This tutorial reveals a host of tips and techniques for creating a stunning surreal illustration

Tomasz Opasinski is a digital artist

This tutorial is a balance between the technical and artistic aspects of my project *Flynn's World*. During the course of this workshop I'll show not only how to create an abstract image such as this, but I also hope to present the overall thought process behind it from start to finish. My approach will be clear and easy to follow and the techniques I demonstrate should save you time in the future.

One of the secrets of my simplistic approach to creating an illustration such as this is actually hidden within the final work; at first glance it looks complicated, but in reality that's not the case. Join me on a 3D journey and, in just a few easy steps, I'll show you how to make your own abstract sculpture art. I hope you'll enjoy it as much as I do!

Concept

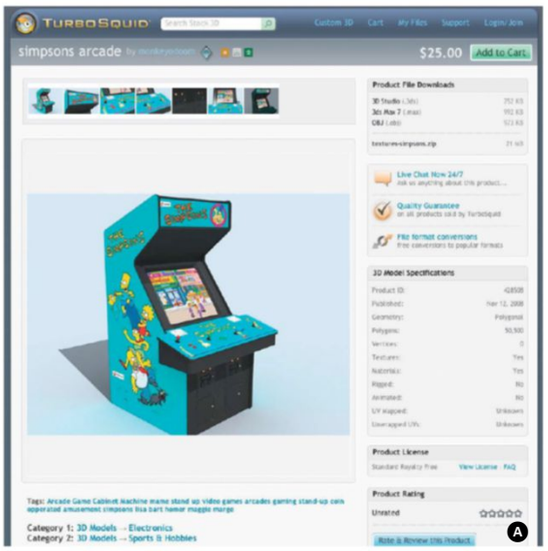
My idea for this illustration came after reading a brief synopsis of *TRON: Legacy*. I hadn't actually seen the film at that point. As a movie poster artist I tried to catch and illustrate a metaphor that ties both of the worlds in the movie – the real one and the fantasy one. *Flynn's World* was the result.

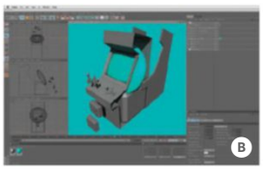
01 Reference and research

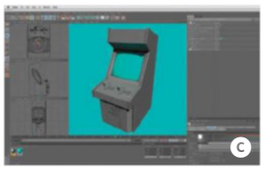
It's been a long time since I played arcade games. I remembered what such cabinets looked like, but I needed to see more details and refresh my memory a bit. This is where the research stage of the process began. I gathered reference images from a variety of sources online to get an all-encompassing view. This helped me to visualise a model of an arcade cabinet that I was happy to take forward A.

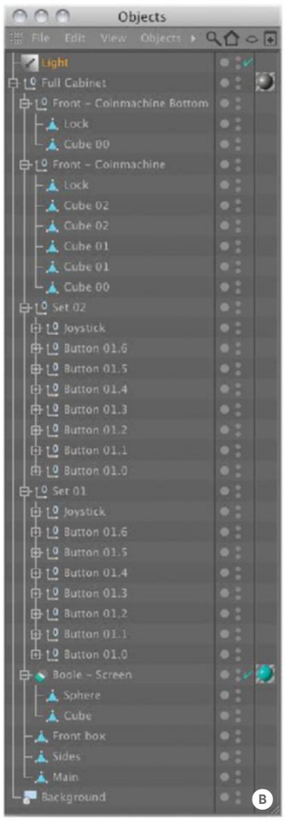
02 Model the arcade cabinet

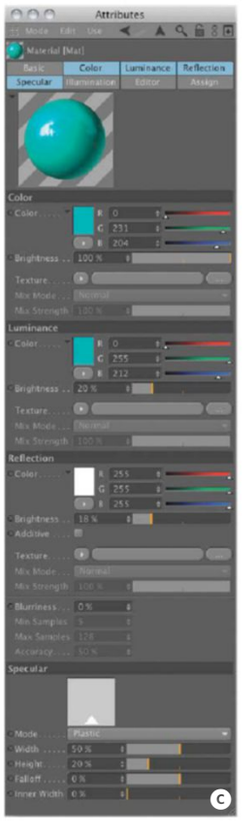
Next, I start to model the pivotal arcade machine. If you look at it from a construction point of view (at least from the outside), it's not a very complicated object. It has a stand (box), two flaps on the side, the screen – which is a flattened sphere trimmed by a box, two sets of buttons (cylinders) and a coin machine in the front (also boxes). If you attempt to build it, please try to keep it low poly, since it's going to be multiplied – by 1,600 times in the near future! For an easier life, you can also get models from 3D stock libraries such as TurboSquid (**www.turbosquid.com**) B.











A Finding the right reference at the start was key to the overall look of the project

B A few basic shapes can create a general idea of the object

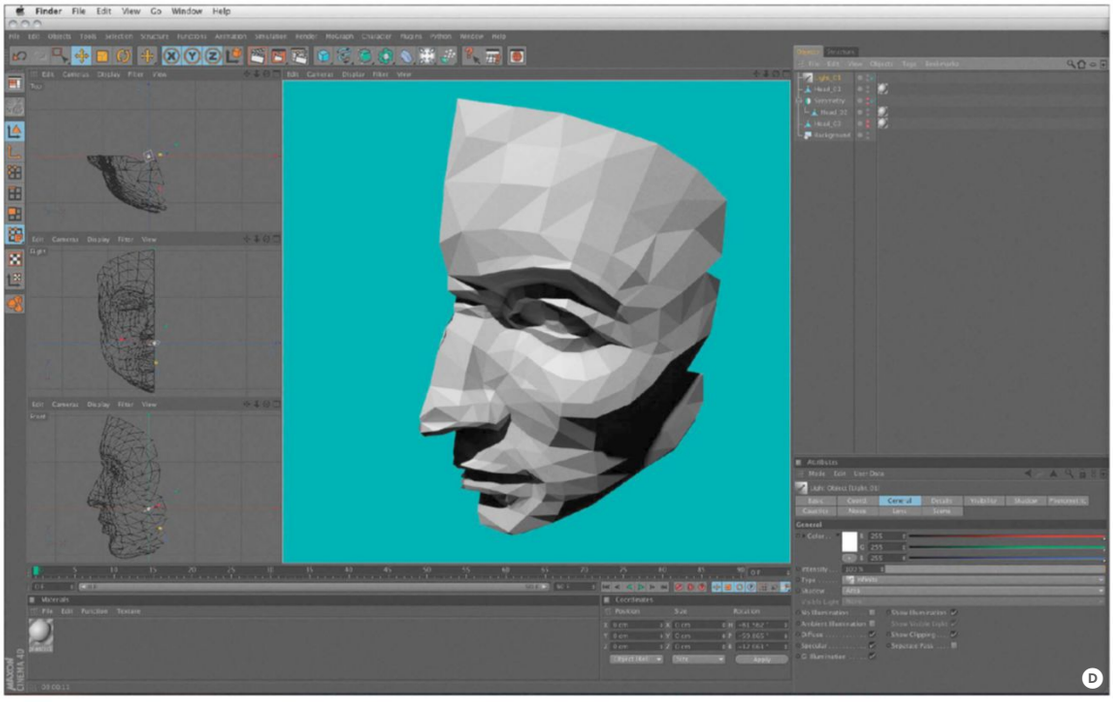
C Simple materials/textures should do the job nicely

03 Give it some texture

You can use very basic materials for this particular project. The key components are: colour, luminance, reflection and specular. As for the cabinet itself, a simple black colour works just fine. Only the screen should have a different colour applied to it – I've used greenish blue, on a slightly reflective surface. Nothing complicated is needed here, so no Bump maps or rust alphas, etc, are required C.

Keep it simple

This project is not about 'ZBrush-like' details



04 Model half a face

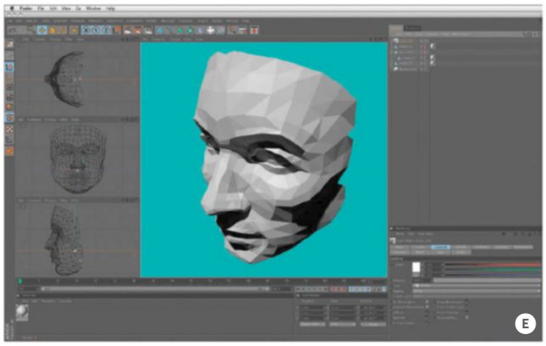
This project is based on only two models: the cabinet and a face surface the cabinets will be laid upon. This step will cover the second element: the face. The reason I only focus on half of the face is that I can simply mirror it, saving myself a lot of modelling time. It all starts with a simple plane and the Create Polygon option in the Structure menu. How and what kind of surface you model is completely up to you... Indeed, it doesn't have to be a face – it could be a hand, flower or a toy. Be creative D.

05 Time to reflect

Once half the face is modelled you can go ahead and use the Symmetry tool. Remember to place your mesh inside Symmetry in the Parent-Children tree (located in the Objects palette). Place both meshes close together, choose orientation (Mirror Plane): ZY, XY or XZ and, from the Objects palette, choose Objects>Connect+Delete. You should now have one symmetrical mesh, ready for use in our cloning process. Don't worry too much about the neatness of this mesh as you won't see it by the end – it will be serving as a placeholder object for the cabinets E.

06 Scene setup

I included this screengrab for one reason: to illustrate how simple this scene really is. Going from the top we have three basic Infinite lights (two of them casting hard shadows), a Target Camera, a Cloner tool with our cabinet mesh inside of it, face mesh (the Cloner tool is using this mesh to propagate the cabinet mesh on the surface). We also have a very basic background (which actually we don't need since the final render will use an alpha in its stead) F.



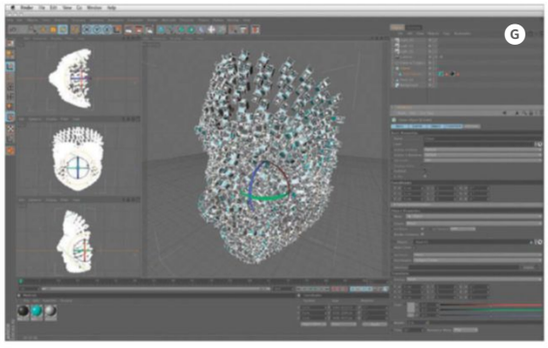
> Once half the face is modelled, go ahead and use the Symmetry tool. Remember to place your mesh inside Symmetry in the Parent-Children tree...

Simple sells

Ever since I started this project, which originally was designed as a poster, I was determined to make it simple, but not too simple. Why? Because this project represents an idea and getting caught up with details may be a deadly trap. Making it over-hyperrealistic may not actually give me anything. So, as a result, I had to decide: how much is too much? This is why there are no texture maps (with colourful imagery wrapped in them) on this cabinet; hence why the screens are not glowing with cool arcade game logos. These elements were not important to the overall image in my eyes; they could ultimately create unnecessary 'noise', derailing your attention from the main focus.

What's left for compositing?

If you look at the final image, you'll see some trace of smoke/fog. This is something that I don't worry about too much when using a 3D program like CINEMA 4D. Such effects are created in the final stages – during compositing in Photoshop. There are several reasons for this. First, with my present knowledge of both programs I feel a lot more comfortable in Photoshop than in CINEMA 4D; second, I'm way faster in Photoshop; and third, it's all about time in my world – it's much faster for me to apply these smoky/foggy elements in PS than try 40 times to render it right in CINEMA 4D. This is my perspective on it, but of course, yours may differ Every artist must adapt a workflow to their own strengths and weaknesses.



07 Importing elements

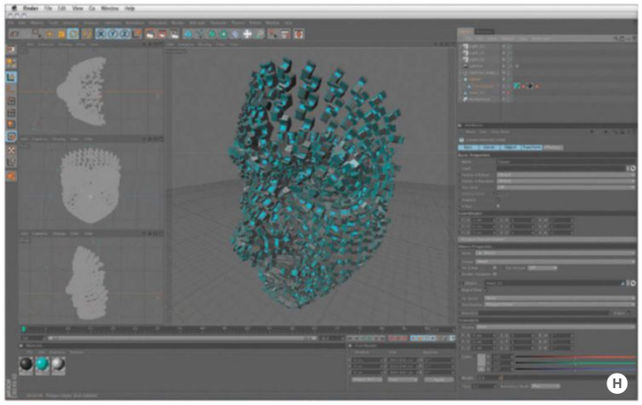
Since I wasn't using any external textures or maps on either element, it's just a matter of copy and pasting the face and cabinet meshes into a new project. Basic materials applied to your models will 'survive' this procedure – so no re-linking to missing maps will be needed. Both objects may appear eventually in different X, Y, Z coordinates – you can easily fix this by typing X=0, Y=0 and Z=0 in the Coordinates palette with the desired mesh selected G.

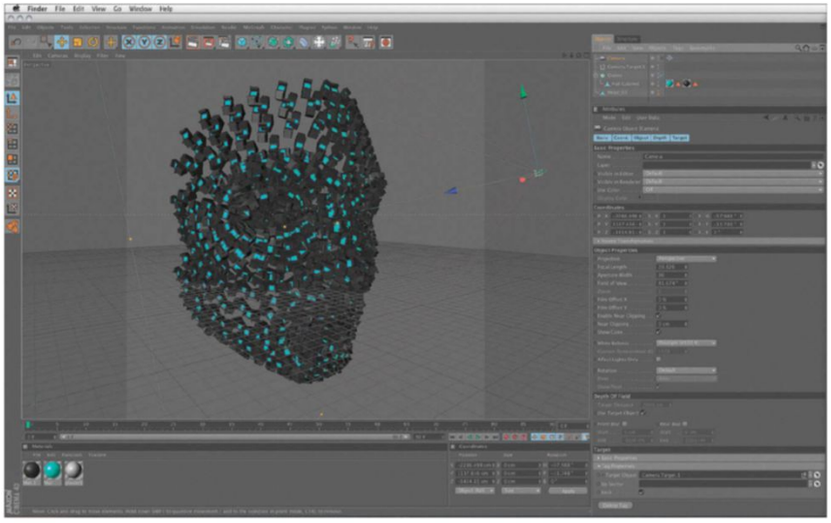
08 Cloner Object

We have both our face and cabinet meshes ready, so let's start cloning! The general idea is as follows: have the cabinet mesh propagated/distributed along the face mesh in some orderly manner. To achieve this I use a Cloner Object from the MoGraph menu. I place my cabinet mesh inside the Cloner Object and link this to the face mesh (by dragging the latter into the object). Once you're in the Cloner Object Attributes panel experiment with: Mode>Object, Clones>Blend, Distribution>Polygon Center or Align Clone... These will give you different variations of what I have done. Some may be more suited to your project than others H.

09 Target Camera

I strongly recommend inserting a simple Target Camera into your project at this stage. This isn't just for focal length or aperture width options, but in general as a steady point of view on your project. Once you set it up you can go back to modelling or lighting, zooming in and out, rotating, panning and, with a simple click, you can go back to your favourite angle – without 'checking and trying' every single time. It's a massive timesaver. It's also very helpful when it comes to rendering. Once your scene is rendered you can always go back to it, change your model, readjust things and render at this same angle. For this project I used only one camera, but you can use two or three if you prefer – switch between them to compare and choose the best shot I.



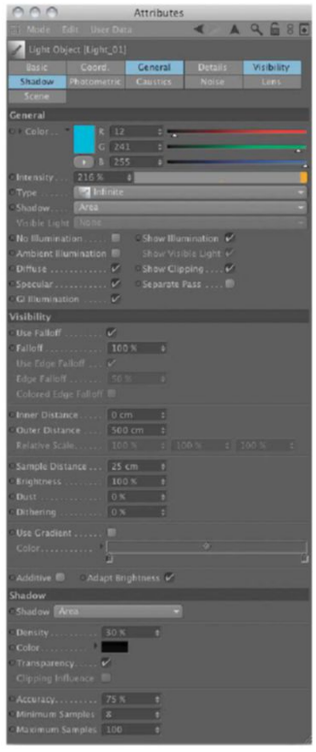


I

10 Lighting

This wouldn't be a complete project without the proper light. For this particular scene, I used three simple Infinite lights. Two of them cast some slight area shadows on my model to push the three-dimensionality of the subject. As far as colour goes, I opted for a light blue colour, similar to the one used for the arcade machine screen – to keep it in the same 'world', surrounded by the bluish/greenish atmosphere. There is no smoke or fog added to my scene at this stage; these elements will be incorporated later during Photoshop compositing. Note: you can also use the Tools>Lighting tool to easily and interactively add lights to your scene J.

J



> For this particular scene, I used three simple Infinite lights. Two of them cast some slight area shadows on my model to push the three-dimensionality of the subject. As far as colour goes, I opted for a light blue colour, similar to the one used for the arcade machine screen – to keep it in the same 'world'

D Modelling a basic face, using the Structure> Create Polygon option

E Using the Symmetry tool will save us a whole lot of time

F This may seem like a complicated scene, but it's really not

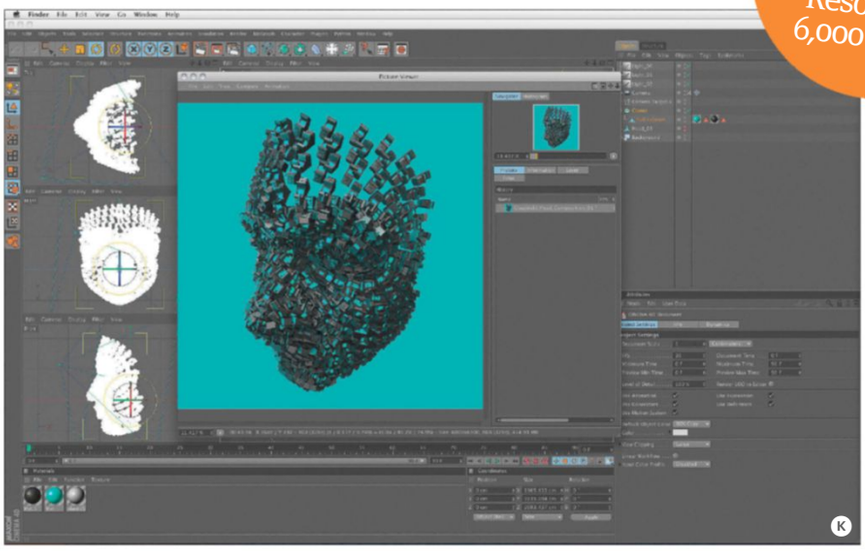
G Once both meshes are ready to use, bring them into a single project

H Cloning has never been easier in CINEMA 4D

I The Target Camera is more than just the lens you're looking through

J Nothing shapes your objects better than light

1 hour render time
Resolution: 6,000 x 6,000



K Rendering out from CINEMA 4D, ready for Photoshop

L The Alpha channel saves you a whole ton of work

M Final adjustments, some colouring and some atmospheric smoke

N Now it's ready to be presented to the world

11 Rendering out

Once I had my Target Camera, Cloner Object and lights in place, it was time to render out my image for further manipulation in Photoshop. From Render>Render Settings>Output I selected my render size at 6,000 x 6,000 pixels (for print use) and Alpha Channel On (for timesaving purposes; this means I won't have to mask anything in Photoshop, as CINEMA 4D will have already done it for me). Once this was finished I went to Render>Render to Picture Viewer where my scene was rendered and saved as a TIFF file with an Alpha channel K.

12 Import into Photoshop

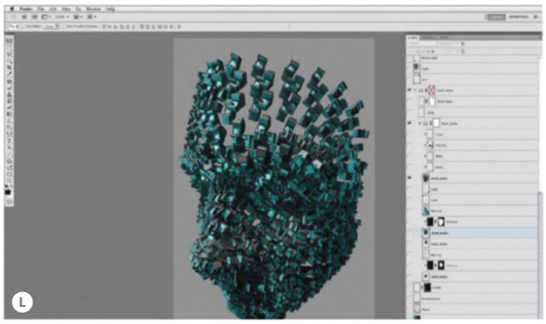
Once the render was done, importing into Photoshop is nothing more than opening the TIFF and dragging it into new 'final project' file... But before you do that, remember that the Alpha channel won't be dragged along with the image! To do this the right way, open up your render in Photoshop, double-click on the Background layer in the Layers palette, name it appropriately and then hit Enter. Now go to the Channels palette and Cmd/Ctrl-click on Alpha; you should see a series of 'marching ants' appear around your selection. Next go to the bottom of the Layers palette and click on the Add Layer Mask button. Now we can drag this layer into the final project file, fully masked. Much easier than masking all those cabinets by hand, I'm sure you'll agree L!

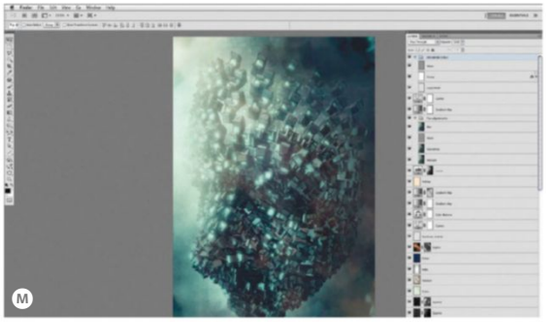
13 Compositing

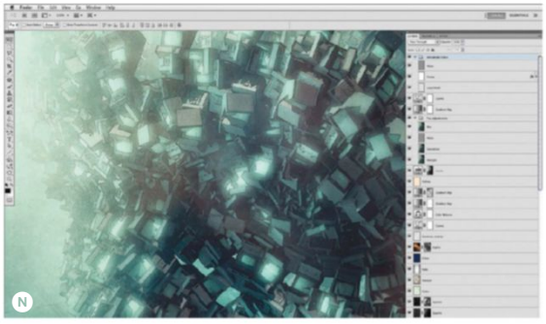
At this stage, I felt I needed a more intriguing background than the flat-green/blue backdrop in my original scene. I also needed colour adjustments and to add some smoke/fog to convey a more mysterious 'mood'. By using large cloud-like brushes, I painted (on separate layers) greyish 'smoke' behind and on top of the rendering. Using a Curves adjustment layer, I had a chance to tweak my contrast and manipulate separate channels (RGB) to shift colours a bit. I encourage you to experiment with the form, ideas and execution when it comes to your projects. It's hard for me to say what kind of adjustments you should use without knowing the context. Don't be afraid to go a little crazy M...

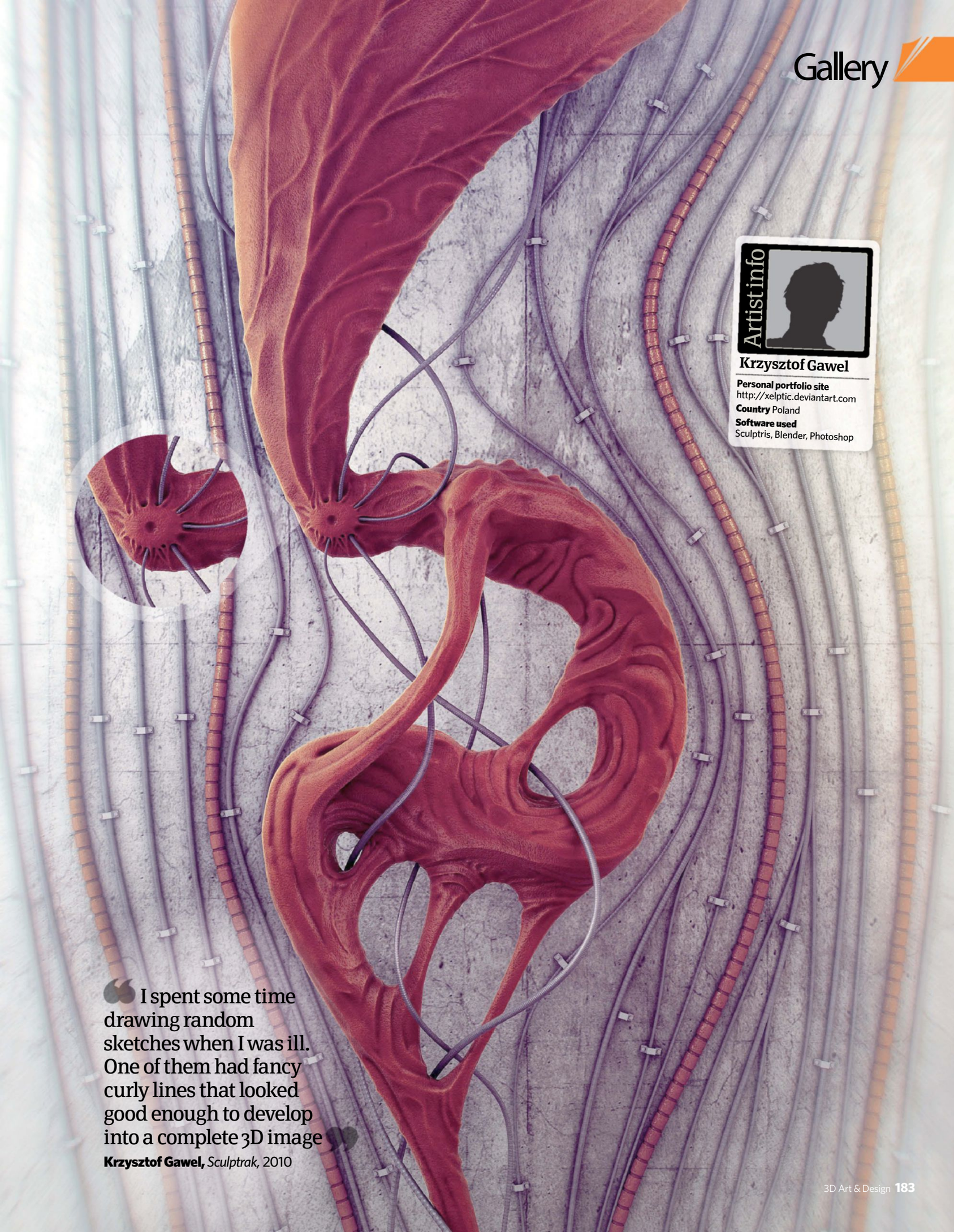
14 Final tweaks

My final poster was 10 x 15 inches at 200 dpi (8-bit RGB). The final render from CINEMA 4D was slightly bigger than this, but I did this on purpose – to scale it down and achieve a more natural look. Also it's better to scale an image down rather than up and risk losing its quality. So, yes... here we are, the project is done. If you only take one thing away from this guide I hope it's the confidence to experiment with your artwork. Where would abstract design be without those willing to push the boundaries N?









Artist info

Krzysztof Gawel

Personal portfolio site
http://xelptic.deviantart.com

Country Poland

Software used
Sculptris, Blender, Photoshop

> I spent some time drawing random sketches when I was ill. One of them had fancy curly lines that looked good enough to develop into a complete 3D image

Krzysztof Gawel, *Sculptrak,* 2010

Software used in this piece

CINEMA 4D Photoshop

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Lewis Rowe

3DArtistOnline

Personal portfolio site www.behance.net/lewisrowe

Country UK

Software used CINEMA 4D Studio R11 (the version with Hair), Photoshop

Expertise Lewis specialises in imagery for brands in the advertising and design industries

Modelling
Textures & Materials
Lighting

Custom typography

Fuzzy Logic 2011

"Create this hand-knitted, soft-looking lettering made from hard polygons"

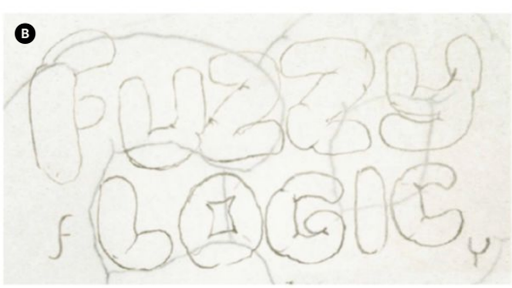
Lewis Rowe is a CGI and digital artist based in London

Most often the things we make in 3D have hard surfaces, but occasionally you need to make something requiring a soft-looking surface. In this tutorial I'll explain how to achieve that with this knitted lettering. I'll be exploring some simple things that make things appear softer despite being made from hard polygons. I'll be using CINEMA 4D here, but the principles will work in any program that can render hair. These basics can be put to use when tackling any kind of soft-looking object, from toys to cloth. We'll start by finding our desired look and feel and then lofting out our type that's sympathetic in form to real knitted letters. This will go much of the way towards a convincing natural look, much more so than just an extruded font. We'll use a photo of some real knitting as a base image texture and then enhance it with some fluff and fuzz using Hair. Finally we'll add some suitable gentle lighting to bring out the colours and avoid any harsh black shadows.

Rough ideas for the model

When starting on a textile-based project it's vital to consider the scale at which it will be seen. At a distance, individual threads and fibres can't be seen, but in a close-up you start to see those threads and possibly the fibres too. It's these fibres that break up the outer silhouette and give it that soft fuzzy look. If you were making an extreme close-up, you would need to create geometry for all the threads. However, at the scale we need, it all ends up as pixels in the end, and if your texture image was lit fairly flat without any noticeable light direction then the natural shading between those threads on the texture will paint the illusion of geometry for you.

01 Define your visual targets Find your look and feel in reference. Pinpoint the key telltale characteristics of knitted things in their typical shapes, colours, textures and behaviour in light. It starts you off down the right road to establish these details and helps you later when you're unsure if your render looks right. Flickr is a gold mine for reference of anything on the planet, and Google's 'search image by colour' feature really helps A.



02 Think knitted It's a good idea to doodle out the letterforms while keeping in mind the characteristic you saw in your knitting reference. This will be a hand-drawn piece of type to give it some charm, a pinch of the naive. You can load your doodle into CINEMA 4D as a guide to trace from or just use it as a visual guide to model by eye B.

Artist showcase

Lewis Rowe

I've worked in graphic design and branding for many years. I was always interested in 3D and along the way used it more and more in design work until eventually I became a full-time 3D artist. My interest is in the kinds of visual language used in brands and advertising.

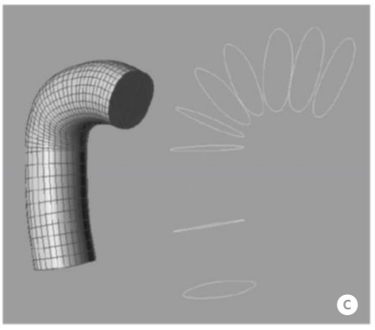
Olay – Hide your age **CINEMA 4D, Photoshop (2009)**
This poster campaign promoted Olay's anti-ageing properties. Women's ages were subtly subverted into camouflage patterns. Spot the '41', '40' and '53'. Retouching: Firstbase imaging.

Chris Boardman's Future Bike **CINEMA 4D, Photoshop (2010)**
The Olympic cyclist's concept for an urban bike of the future. It has fingerprint locking, navigation, self-recharging lights and other features controlled from the rider's iPhone docked in the crossbar.

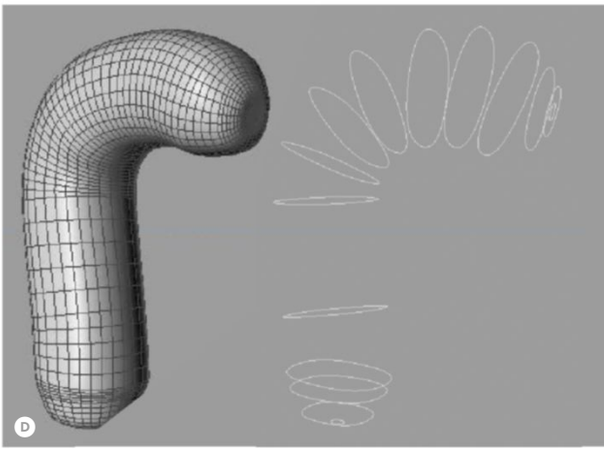
The Glenlivet, Scotch Whisky **CINEMA 4D, V-Ray for C4D, Photoshop (2011)**
A classic product shot render using V-Ray forC4D and a studio-style lighting setup.

Tackling type

Words that maketh woolly

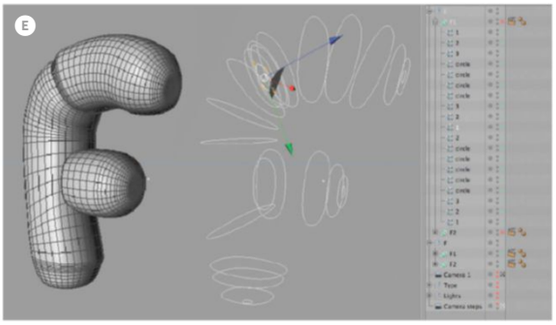


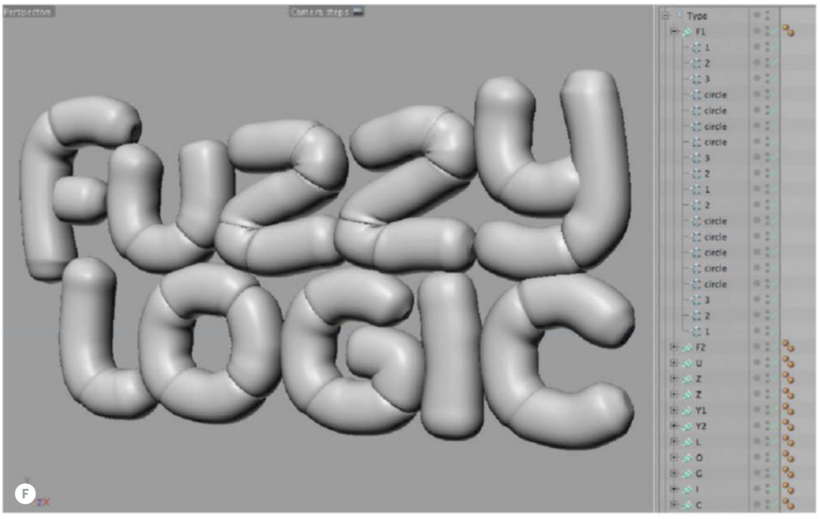
03 Lofting the type In CINEMA 4D, start by creating a square spline primitive, make it editable (hit C) and change its type in attributes to B-spline. This gives you a non-pure circle for the letter's profile. Place this inside a loft object and position the circle at the starting point of your first letter. Duplicate the circle and move it to the next place in the shape of your letter. The lofted shell grows like elastic as you add circles, allowing you to try out nice curves along the way C.



04 Rounding the ends Add circles to complete the first letter. Try to use fewer circles. These letters will have joins as if they've been knitted in parts, so ensure you have a circle in all the places where a join will appear. Add a couple of extra circles at the ends of the letter and scale them smaller to round them off D.

05 Add joins to the letter We will make some joins to make it look like our type was knitted in parts and sewn together. Add a couple of extra circles where joins are to go. Move these new circles through each other to make the lofted skin overlap itself. Then scale the centre circle smaller to pinch the tube shape inward, creating a seam E.



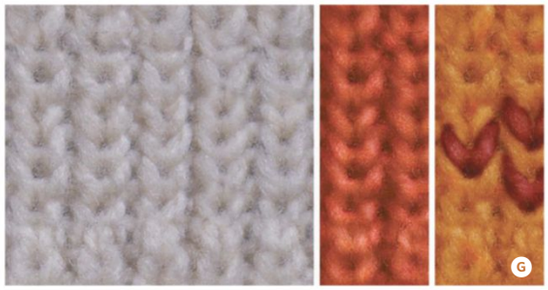


06 Complete the words Make the rest of the letters in the same way, each with their own loft object. Tweak their shapes until they sit well together as a family and are legible as a word. You can add a little bit of bend and sag here and there. If you don't usually create hand-drawn lettering, just give it a try as this is more like modelling than font design F.

Textures & materials

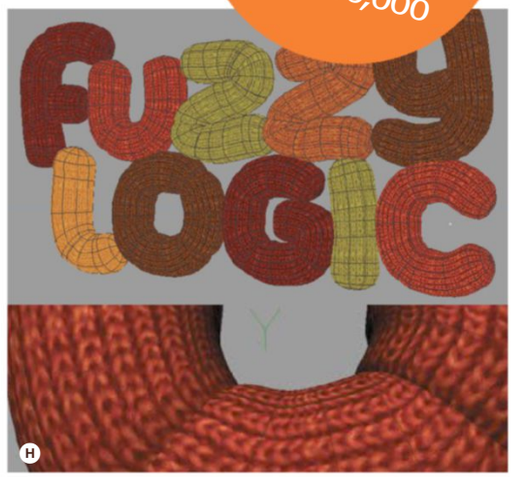
Here comes the fuzz

2 hours render time
Resolution: 6,000 x 6,000



07 Make a tilable knitted texture Either photograph some flat knitted material or purchase an image. Most important of all is that it is flatly lit without any directional lighting or highlights. In Photoshop I edited out obvious flaws and ensured it tiled seamlessly with the Offset filter. I saved some different colour versions following my reference and also made versions with coloured stitched pattern for detail G.

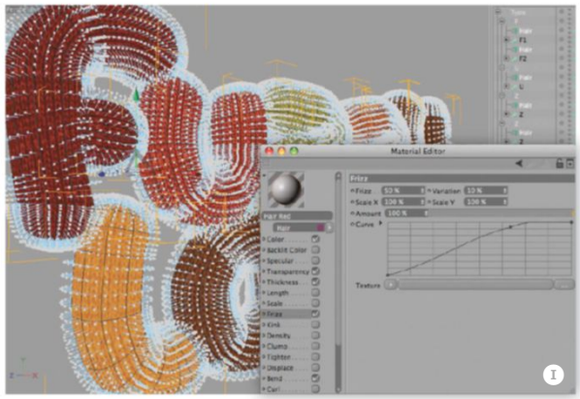
08 Make the base material It's a very simple material. Load your knitted image texture into the colour slot of a new material in C4D. Turn off the specular channel. Select Oren-Nayer as the illumination model in the illumination channel. This produces a flatter and more gradual shading between light and dark. We want to avoid the hard and round and plastic. In this case I didn't use any bump map, as it added nothing good to the look of the image texture. Apply the material to your letter and adjust the material tiling so the threads look the right scale to the letter and not squashed. Add the other colours in the same way H.



Tuning things

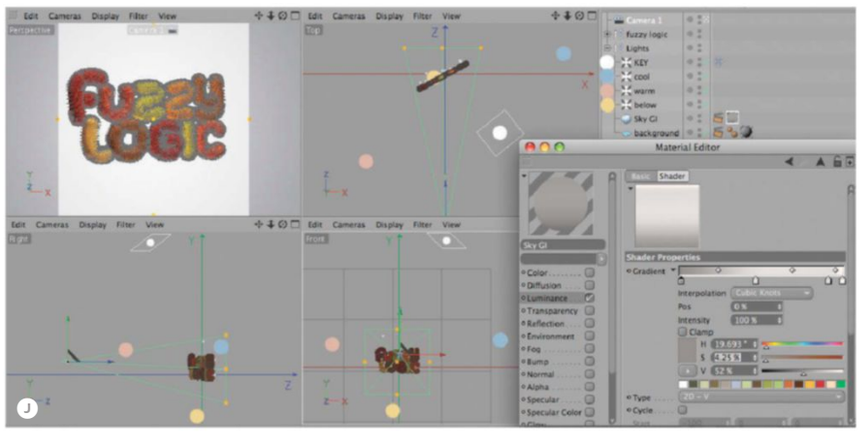
If things don't quite look right it's usually the case that a few subtle things need a little adjustment. Try these first:

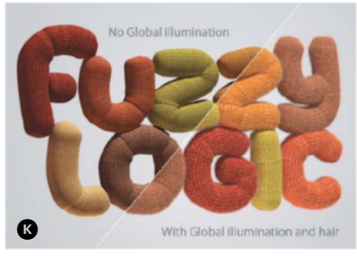
- Does the base texture scale look right?
- Does the choice of colours and saturation look natural? Sometimes, reducing the saturation will stop any colour 'blow-outs' that can flatten the shading.
- If you're getting overly harsh contrast, try adding a sky object with a grey luminance material to bounce some more even light with Global Illumination. Then you can lower the strength of your main lights and you'll have a more gentle spread of light. Having Linear Workflow enabled (in the document settings) also helps.
- Are the hairs the right thickness, length and density? Don't cover up too much of the base texture unless you're going for a fluffy/fur look.
- Is the camera lens suitable for this size of subject? A wide cone angle will make it seem like the size of a bus; while a narrow one will give much less perspective, making it look more miniature.
- Finally, keep referring to your reference image(s).



09 Add hair Select each letter one by one and select 'add hair'. The default hair guides are long, so set them to a short fuzz length. Give each letter a hair's material whose colour is slightly brighter than the wool colour. No need to brush the hair – just add a little frizz and bend and adjust its thickness in the hair material. Set the hair count to about 14 times that of the automatic guide count. What we want to do is get the fuzz to hide the hard edges of the geometry and also help to break up the wool image with a fine layer of surface fuzz. Test-render just one letter first and tweak your hair count and hair material as needed. You can achieve many different looks, but stick to your reference. If it proves hard to hide the geometry edges, try duplicating each hair object and set the guide lengths to something much shorter. This will add a second fuzz 'undercoat' to cover those edges I.

10 Lighting setup For the lighting we want to give form to our type but without any harsh highlights and shadows, to keep things bright and soft. First, set your desired camera angle and stick to it. If you want your type grounded on a floor and not floating in air, add a curved L-shaped studio cove as the floor and wall. Otherwise add a background plane. These will both bounce some light back on the object and seat it better in that environment. Add a key light and choose your main direction of light that gives the best form to the shapes. Most often, light is from above but it could be from one side like a window. Switch on soft shadows J.





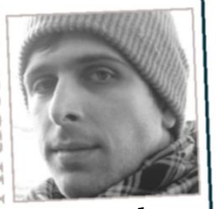
11 Spread the light To make the light spread nicely, enable Global Illumination. Set the GI settings to fast/low as no detailed GI shadowing is needed here.

Do a test render. Address any unwanted dark sides with a half-brightness fill light or two. We want to give any black/grey shadowy parts a bit more life and richness to their colour, so the fill lights with GI will really help these. You could also try a back light to pick out some edges of the type. Once the test renders are looking good, go ahead and render the final image K.

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info



Ted Lockwood

3DArtist online

Username: TedLockwood

Personal portfolio site
www.monkeyknifefights.com
Country USA
Software used
ZBrush 4
Expertise Ted mainly sculpts creatures and characters for videogames, advertising and film

ShadowBoxing with style

Blockette 2011

Use the new ShadowBox tool in ZBrush 4 to blend a stylised character with abstract shapes

Ted Lockwood is a freelance character artist

Source files available

'Bust_Base.obj'
'Blockette.ztl'

In this tutorial, we'll be demonstrating how to use ShadowBox, one of ZBrush 4's powerful new tools, in conjunction with several other features, to build a stylised, abstract character with a loose, fun workflow. The goal of this guide is to equip you with the tools and knowledge to concept, explore and develop an idea entirely within ZBrush. The more comfortable you are with your tools, the less you have to think about how to create what you want, and the easier it is to just let the ideas flow!

ZBrush is one of the few 3D programs that enable artists to use fluid and expressive techniques usually reserved for traditional media, with the technical capabilities only possible in the digital realm. As you follow this workshop, keep in mind that you should always be experimenting with the sculpt. Save frequently in iterations, move up and down through subdivision levels, and try not to get locked into an overly specific concept.

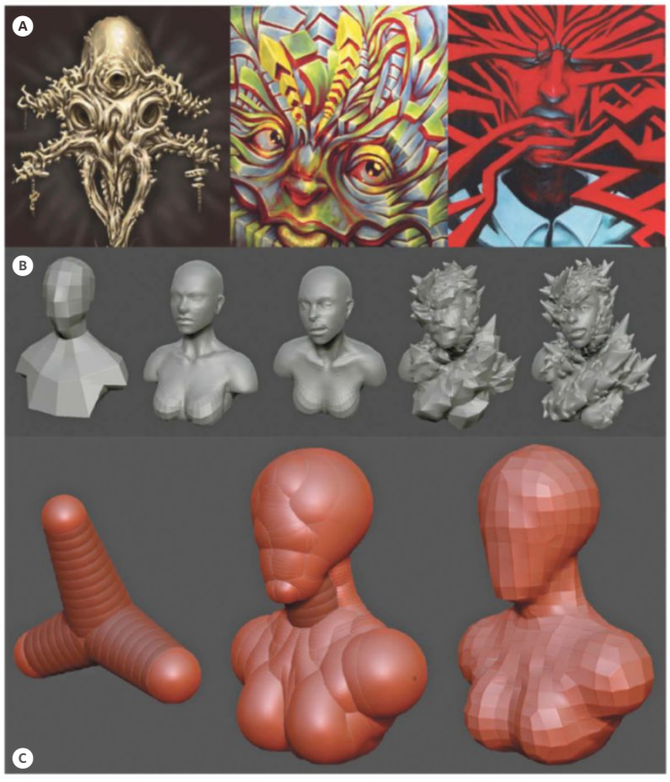
We'll see how to develop organic and hard-surface models from scratch, and explore different ways to manipulate and combine them to create truly unique and expressive sculpts. This is an advanced tutorial that assumes you already have a firm grasp on the basics of ZBrush.

Concept

I've always been fascinated by traditional art that combines abstract, angular forms with familiar organic shapes to produce surreal illustrations. For this project, I'm attempting to create a similar concept entirely within ZBrush.

Style exploration

Finding your direction



01 Get in the mood

I like to begin my character sculpts with an attitude or feeling to base the character on. It helps give me a solid direction for the pose and expression, without putting limits on the design itself. Keep a small mirror handy for studying your own expressions, and always grab reference material to draw from A.

02 Play with ideas

Using the base mesh included on the disc, begin laying out the basic anatomy with Symmetry turned on. Once you've got the main features in place, save your sculpt, turn off Symmetry and really start playing with it. Push yourself to make shapes and forms outside of your comfort zone B

03 The base mesh

Create a ZSphere, activate Symmetry and build a simple base for your model. Press Shift+A to enable ZSketch mode, and begin drawing on the ZSpheres. Hit the Optimize button occasionally to clean up your sketch. Hit 'A' once to preview the mesh, then again to continue editing. Then select Make PolyMesh 3D once you're happy with your mesh C.

A Combining abstract 3D shapes and organic designs can produce truly unique, eye-grabbing illustrations

B When you find a design you like, save it and create another

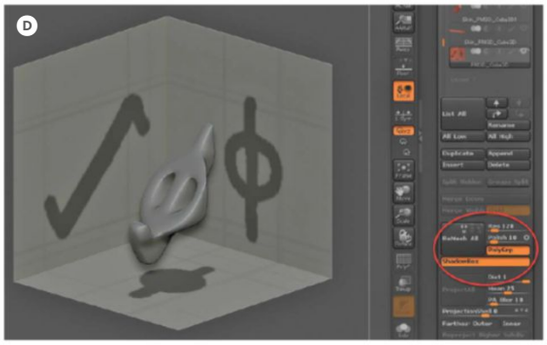
C Make sure you have uniform polygon density and use the Shift key to smooth your ZSketch as needed

Software used in this piece

ZBrush 4

Tools of the trade

ShadowBox, alphas and Transpose



> Knowing how to use the Transpose tools is essential for quickly manipulating different SubTools. Play with the Move, Rotate and Scale tools to familiarise yourself with what they can do

04 Introduction to ShadowBox

Create a Cube3D primitive and press Make PolyMesh 3D, then activate ShadowBox by hitting the button near the bottom of the SubTool rollout. Holding the Cmd/Ctrl key, click and drag anywhere on the canvas outside the ShadowBox to clear all masks. Play with drawing masks on the three sides of the ShadowBox and see how they affect the resulting object D.

05 Let it slide

The ShadowBox panel has two sliders: the Resolution (Res) slider and the Polish slider. The Res slider, unsurprisingly, determines the resolution quality of the ShadowBox planes and the resulting mesh, while the Polish slider affects the overall smoothness of the shapes E.

06 Alphas in ShadowBox

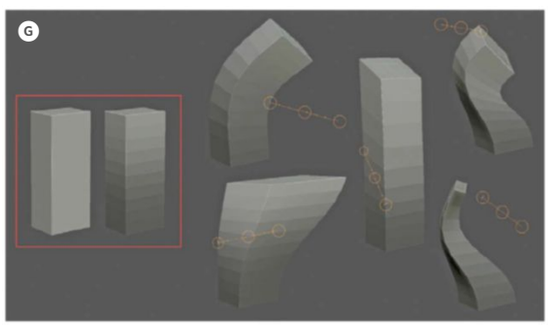
Now that we've got the basics down, we can really start exploring the power of ShadowBox. Using Alpha masks created in Photoshop, we can create even more complex objects. You can use all the existing ZBrush masking tools within ShadowBox to create almost any shape imaginable F.

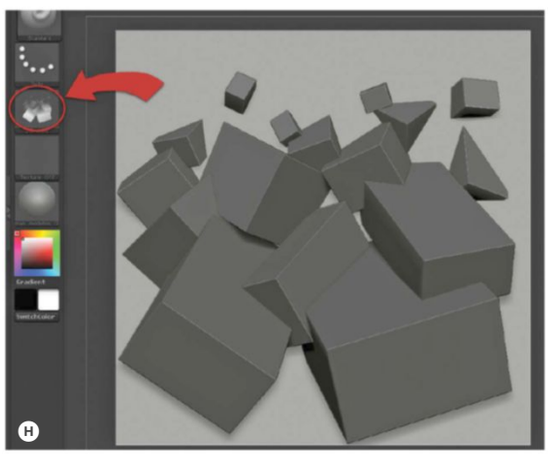
07 Get crazy with Transpose

Knowing how to use the Transpose tools is essential for quickly manipulating different SubTools. Play with the Move, Rotate and Scale tools to familiarise yourself with what they can do. The last circle on the Move gizmo, for instance, is perfect for distorting and scaling the kinds of shapes we're working with in this tutorial G.

08 Create the block alpha

To combine the abstract shapes and organic sculpt we'll make an alpha to simulate blocks growing out of the character's skin. Create a Plane3D object and append a Cube3D primitive. Duplicate the cube a few times and use Transpose to orient them until your tool looks like that in the screengrab. Hit the GrabDoc button in the Alpha menu to turn your tool into an alpha H.





The mighty ShadowBox

The new ShadowBox tool in ZBrush 4 gives artists the ability to create objects and shapes never before possible in previous releases. The simplicity of the workflow hides a very robust and powerful feature.

By drawing masks on the three ShadowBox planes, it creates new objects out of the intersection of those masks. With a little practice, ShadowBox can quickly become one of the most useful components in your ZBrush workflow.

Using Alpha masks created in Photoshop or another 2D program, we have even more freedom with what we can create. Combining alphas with the various types of symmetry within ZBrush, we can easily build anything from unique base meshes for sculpting, to complex hard-surface objects like gears and ornaments, to mind-bending abstract shapes. This walkthrough provides a basic understanding of how to use ShadowBox, but in reality, we're barely scratching the surface!

D Keep Perspective disabled while using ShadowBox to avoid accidentally masking other faces

E Changes to the Res and Polish sliders won't appear until you turn ShadowBox off, then back on

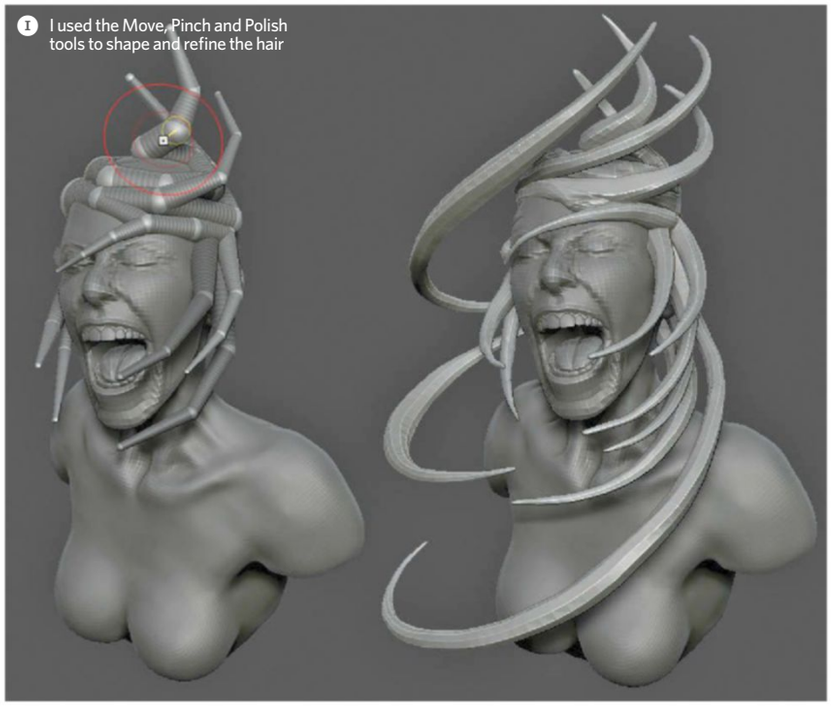
F Turn up the resolution to use more detailed masks

G Use a blurred mask to attenuate the distortions and keep part of the SubTool anchored

H Make sure none of your blocks go past the edges of the plane

The final sculpt

Putting it all together



I I used the Move, Pinch and Polish tools to shape and refine the hair

09 Organics

Use the base mesh we created earlier with ZSketch to sculpt the anatomy and pose that we blocked out in the concept phase. I used ShadowBox to create base meshes for the teeth and tongue, and ZSpheres for the hair I.

10 Block it out

Append a Cube3D SubTool to your body sculpt, activate ShadowBox and clear the mask. To create a simple abstract shape that will deform cleanly, I used the minimum Res and Polish settings. Once I create the basic block shape, I use masks and the Transpose tools (Move, Rotate and Scale) to give it a flared form J.

11 Create block clusters

Use Decimation Master to bring the polycount as low as possible, then duplicate the block and use Transpose to build a cluster of them. Hide everything else and hit the Merge Visible button to turn them into a single tool. This resulting object becomes a new separate tool; you'll need to append it back into your main project K.

35 mins render time
Resolution: 3,000 x 3,000

L Using a 50% RGB Intensity helps to blend the colours

M A great tool I occasionally use is **www.colorschemedesigner.com**. The colour picker is intuitive and has a whole range of options for playing with colour variations

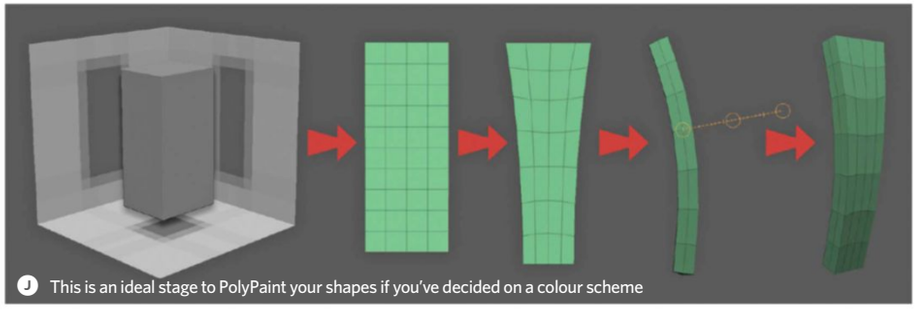
N Activate the Topological brush option to simplify PolyPainting your giant cluster of blocks

O ShadowBoxes for the tongue and teeth base meshes

PolyPainting

First, we'll need to decide on a colour scheme. I've decided to paint this character with relatively realistic colours, but the blocks and hair really have to pop, so we can use some bolder shades for those. For the skin, activate PolyPainting and lay down a base layer of a generic skin colour by going to the colour menu and pressing 'Fill object'. Human skin has a lot of subtle layers and colours, but we're only going to worry about the warm and cool spots on the face for this. Lay down some blues and reds in the appropriate areas, as per the screenshot, and then go over them with the base skin colour to blend.

Gradients are your friend. I've found the blocks and hair look best with a darker colour near the roots, transitioning to a much lighter tone towards the ends with a slight change in hue from base to tip. The hue change gives them a much more dynamic feel, and the gradient helps lead the eye. ZBrush 4 has a handy new option that helps a lot with this: the Topological automask. Located in the Brush menu, turn this on and your brush will be bound by the topology of your sculpt. With every new stroke, you'll only affect the piece of geometry you started on until you begin another. This feature can be applied to any brush for PolyPainting and sculpting, and it helps a ton with precision editing busy topology, like these blocks!



J This is an ideal stage to PolyPaint your shapes if you've decided on a colour scheme

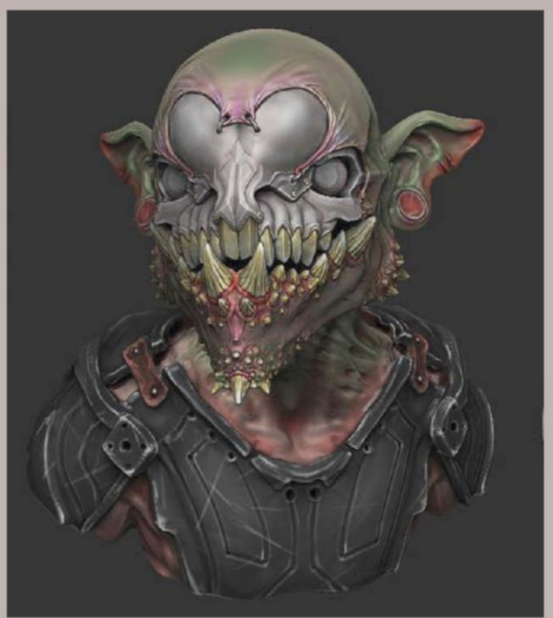
K Make sure you keep the polygon count low

Artist Showcase

Ted Lockwood

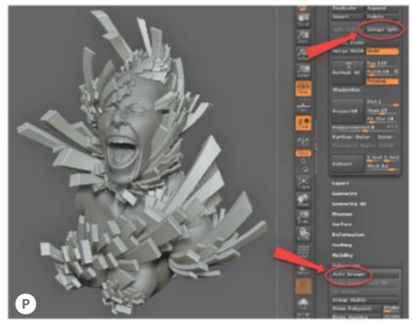
I began my career five years ago as an outsourcing artist in the games industry. I discovered ZBrush and acrylic painting around the same time, which quickly transformed art from a job into a lifestyle. Since then, I've spent most of my time playing with paint, sculpting and trying to find new challenges.

Old Boy **ZBrush 3.5r3 (2011)**
End product of a ZBrush sketch session

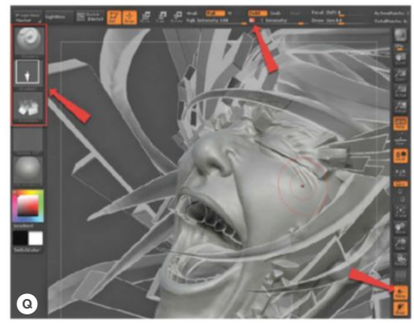


Gobby **ZBrush 3.5r3 (2010)**
End product of a ZBrush sketch session

Woody **ZBrush 3.5r3 (2010)**
Warm-up sketch for a ZBrush contest



To switch between SubTools easily, hold Opt/Alt and click on any SubTool to make it the active tool



Play with the FocalAngle slider in the Draw menu to push the style even more

12 Place the blocks

Now that we have a nice library of blocks, begin duplicating and placing around the model. Then, hide everything else, merge them into one tool and replace your many SubTools with the new merged one. Use the Auto Groups button in the PolyGroups rollout to assign a unique PolyGroup to every block, then hit Groups Split in the SubTool rollout to make every block a unique SubTool P.

13 Tie it all together

Finally, we'll use our blocky alpha to integrate the blocks with the character. Using the Standard sculpting tool with a high Z-Intensity, select the DragRect stroke type and the block alpha. With the character SubTool active, hit the Transparency button and place transition blocks where the character and block SubTools intersect Q.

> Use the Auto Groups button in the PolyGroups rollout to assign a unique PolyGroup to every block, then hit Groups Split in the SubTool rollout to make every block a unique SubTool

Rendering

For the final render, I use a variety of different materials and lighting setups, but I always include these few basic render passes:

- Flat Color – this will serve as the base layer for the composite in Photoshop
- Side, rim and backlights – set these to Lighten or a similar layer style
- Ambient Occlusion – a lot of materials will give you a decent AO when rendered with the Best setting. See the screenshot for the general look we're aiming for. Try a Multiply layer style for this
- Depth map – this helps to really pop your image. Create it by going up to the Alpha menu and selecting GrabDoc. ZBrush will take a screenshot of your current tool and put it in the alpha library, from which you can export it. Material settings and PolyPainting do not matter for this.

With these renders, we can start building our composite in Photoshop. Play with various layer styles and try rendering out some other passes with interesting material and lighting settings, and you'll have a great-looking image in no time!

Render passes, clockwise from top left: Depth, Flat Color, side light et al and Ambient Occlusion

Hit the GrabDoc button under the Alpha menu to grab your Depth map

Artist info

Kamil Solminski aka Trisme

Personal portfolio site
http://cargocollective.com/trismeart

Country Poland

Software used
CINEMA 4D, Photoshop

Work in progress...

> This piece was mainly inspired by those summery drum 'n' bass tunes. I started making some abstract shapes in CINEMA 4D then played with them in Photoshop

Kamil Solminski aka Trisme, *Expressions 2,* 2011

Digital graffiti

3D Artist 2011

Modelling
Lighting
Compositing

> This tutorial shows some techniques to go from the initial sketch to creating a finished, 3D graffiti piece

Brad Schwede Freelance designer

This tutorial will focus broadly on ways of translating graffiti to the digital world. Over the next five pages I will take you through the early concept stages and how I lay out my work, right through to dealing with 3D lettering and how the final image comes together. I will outline some of my approaches to 2D lettering especially for 3D graffiti as well as how I model it. My approach to translating traditionally 2D graffiti into the third dimension is about getting a final image that I am happy with rather than building a perfect mesh. This is because the geometry is normally only for a single render and is never usually animated.

Concepts

Design the lettering

Software used in this piece

Photoshop · Alchemy · 3ds Max

01 Go for a walk

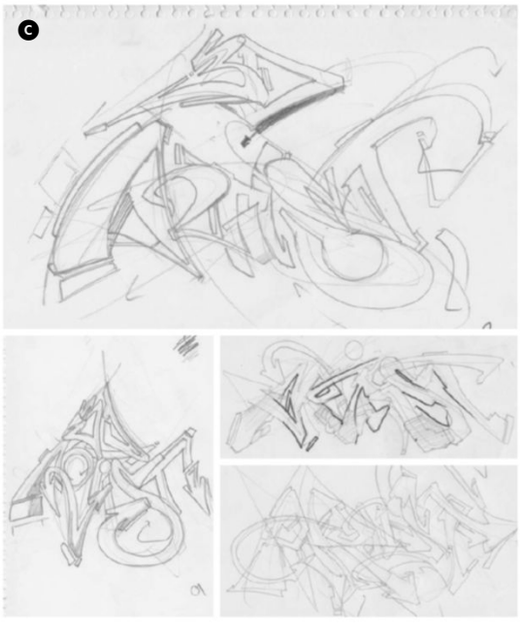
I would recommend getting off the chair, taking your camera out and photographing some graffiti. There is a whole understanding of balance or flow that artists take years developing in their work. Take close-ups of specific letters, colour schemes and just get some ideas going A.

A

B

02 Digital ideas

I always start in Alchemy or Photoshop with the thickest brushes that are still legible. This stage is about getting the text to sit well and exploring how the letters can come together. I do heaps of these quickly, without saving them, as it's really just about getting the blocked-out shapes right in my head. I also block the lettering out into the 2D shapes like a triangle or X shape to further establish how I want it to sit B.



C

03 Sketches and more sketches

This is the most important step in my opinion. If I sketch on paper I use a 2h pencil to do my initial work and a 2b to outline. This is still very rough as they are just references for modelling. You can try different layouts, letters, weights and ways the characters can interact. If you are new to graffiti design, I would also recommend doing layers in different coloured pens; a red layer for the base, highlights in green and blue flourishes. When you scan it you can select those RGB channels in Photoshop to get a better understanding of how it comes together C.

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Brad Schwede

3DArtist online

Personal portfolio site
www.graffititechnica.com

Country Australia

Software used
Photoshop, Alchemy, 3ds Max

Expertise I enjoy translating my real-world graffiti into the digital realm using many different approaches and techniques. I am also interested in what possibilities the digital world can offer the next generation of writers

Artist showcase

Brad Schwede

Graffiti Technica started as no more than an experiment. I wanted to see what could be achieved using modern tools to put my own spin on the future of graffiti. No one seemed to be doing it at the time and I thought modern VFX techniques would make for some interesting art that couldn't be achieved with paint.

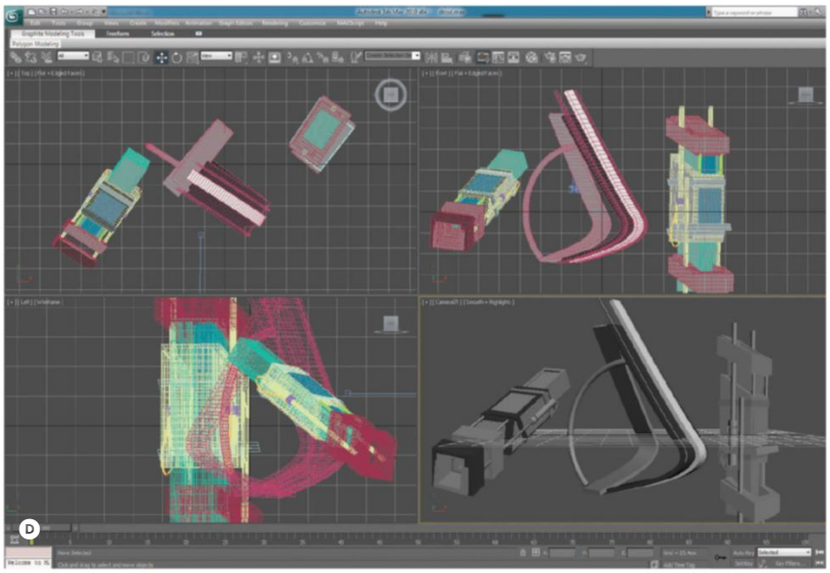
Skeme **3ds Max, Photoshop (2010)**
Skeme was an experiment in balance. I was trying to get a balance to the colour, weight and to the way the letters sit together. It's actually a very simple design but it is still one of my favourites

Droid **3ds Max, Photoshop (2010)**
An example of how two elements can be repeated to create something interesting. I did this after going to a lecture by a typography designer in Sydney; I was inspired by how he designed each element of the letter in isolation rather than as a whole

Terminate **3ds Max, Photoshop (2010)**
Terminate was experimenting with a wildstyle design and how to deal with parts of letters going in front and behind other letters. It was also about understanding how basic geometry (a pyramid) can influence graffiti design

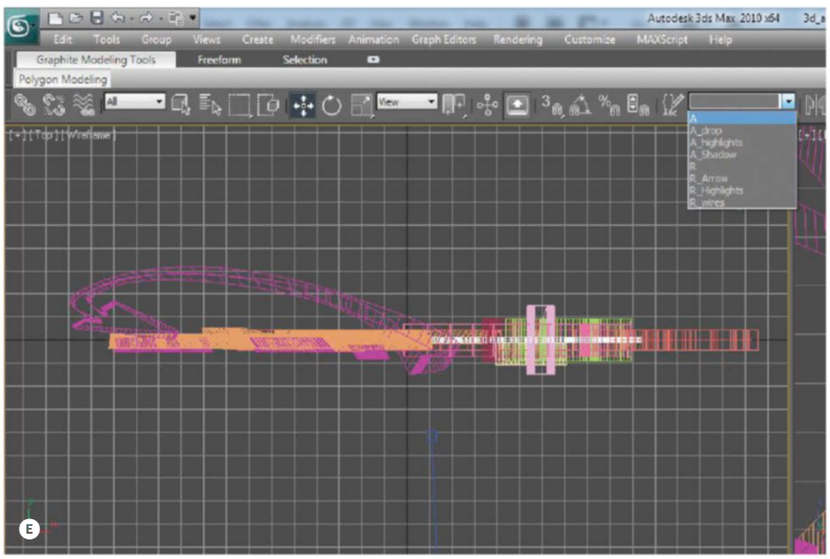
Modelling

It's about the final look, not a perfect mesh



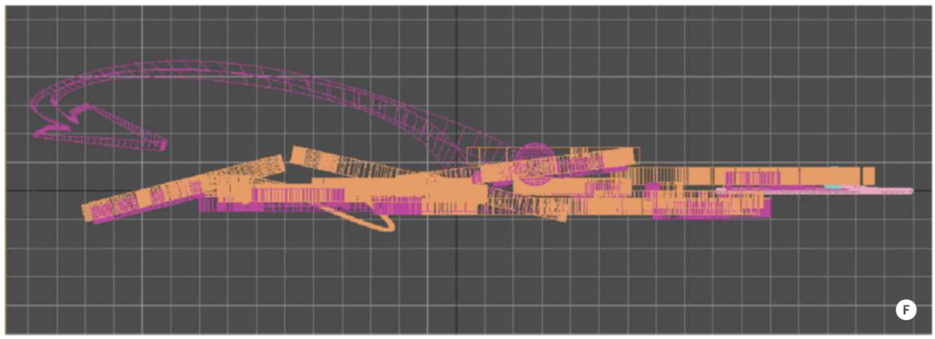
04 Model the letters How I model depends on the lettering. It is a mix of extruded splines, simple primitives and Boolean operations. I would strongly recommend using multiple techniques, though, as limiting yourself to just one generally makes the work very flat. I also abuse my mesh here. Intersecting geometry, broken mesh – it doesn't matter. For this work I started with the rough outline splines (in red) with Enable in renderer and Viewport turned on, then blocked out the rest of the shapes.

If you feel comfortable modelling in a traditional way, you can use the method in this screenshot where I only modelled two elements. The upright and the curve, or bowl, of these were modelled using primitives and cloned to make the rest work D.



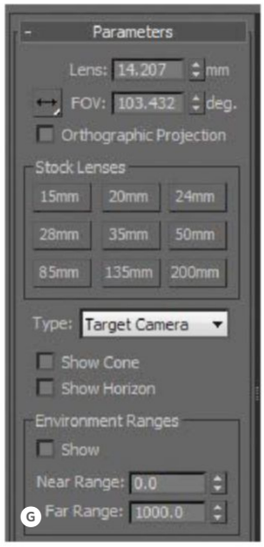
05 Name selection sets After I have a mesh that I am happy with, I move on to naming all of the sections of the letter. Usually I have the letter A then a section called A highlights, then A arrows and A shadow. This step is a fairly boring part of the workflow, but in complex, wildstyle graffiti it sometimes gets hard to see what geometry is going where. This stage also helps when texturing.

I start applying any basic materials to the meshes so I can right-click the material in the material window and choose the Select By Material option. It is just a different way of selecting the elements that I find useful E.

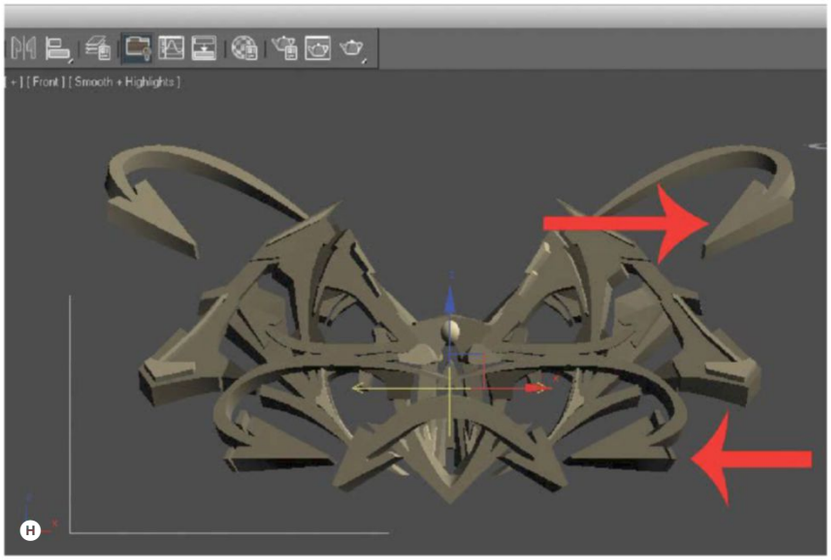


06 Rotate and position letters This is the stage where I start moving geometry forwards and backwards away from the initial layer of the letter. I put my base graffiti on x0 y0 z0 then move each selection back or forward using the sets from the previous step. You need to plan a lot of this when you are designing your initial sketch, as moving things too far can unbalance the work. The idea here is to get as much depth in the lettering visible at one angle while keeping it all legible F.

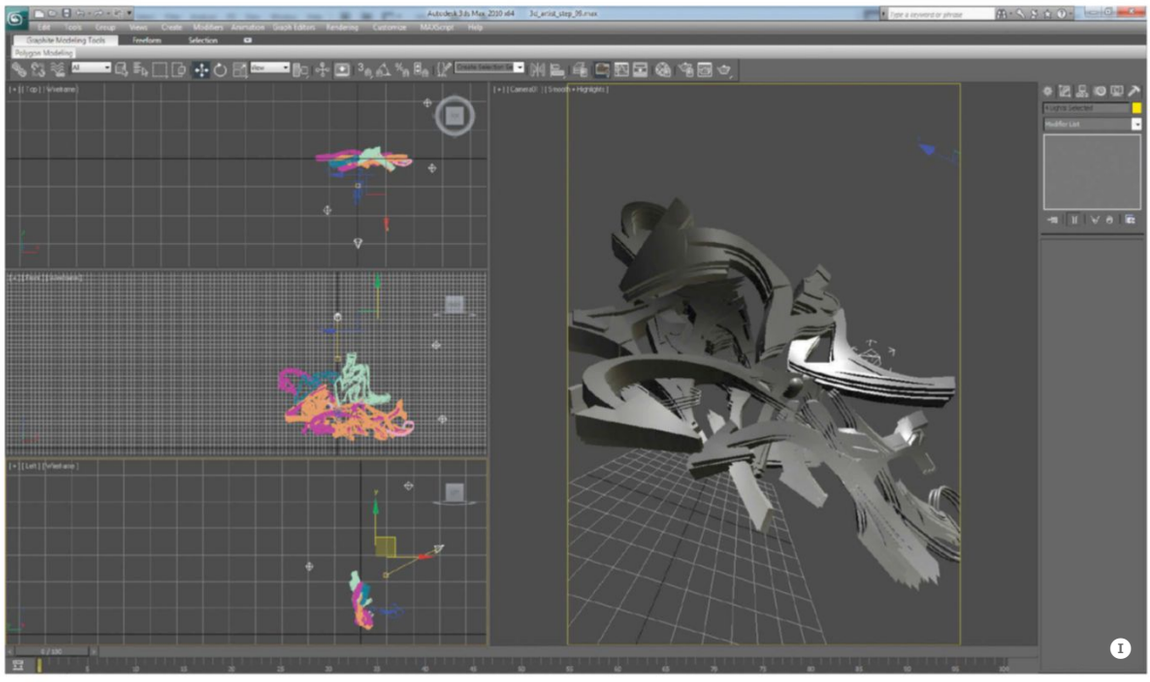
> You need to plan a lot when you are designing your initial sketch, as moving things too far can unbalance the work



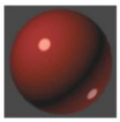
07 Camera angle As this is lettering, there is at best a horizontal angle of 180 degrees that you can view it from. You obviously can't go behind the word, and in the last step, when moving the selection sets of the letter back and forward, you reduce the camera angle even more. For the finished image I used a target camera slightly off centre with a lens of 14.0mm and FOV of 103 degrees. This big FOV gives a distortion that I use in my work to increase the perception of depth G.



08 Reflect it One technique I use to get a better composition to the lettering is to use the Symmetry tool in Max. You have to group all your letters first then apply the Symmetry Modifier and Mirror on the X axis. You need to hit Flip as well so that it mirrors correctly with the gizmo moved to the centre. I save this image as it can help balance the work later on when compositing. You are looking for where the most weight is and where parts reflect in space. In this case the two graffiti arrows are the most important points H.



09 Lights Using mental ray to render, I set all my geometry to generic Plastic/Vinyl presets (all RGB values at .5 to make grey) so that I can focus just on light and dark. Working from the back light first (MR omni .5) then working forward to the key and fill lights with one target just to lift out the letters. Turn on Global Illumination at this point to get an idea of the final lighting. The idea here is to get a mix of light on the lettering and light being caught by the edges to create hot spots and hard edges I.



Lighting and texture

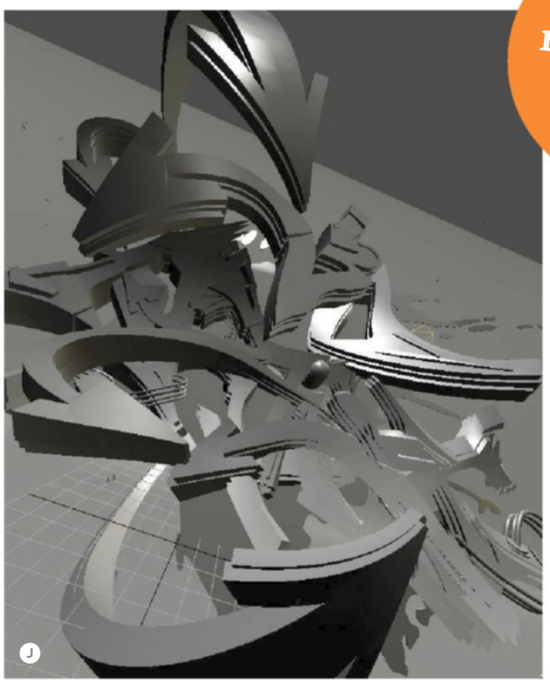
Set up for rendering

1 hour render time
Resolution: 2,480 x 3,508

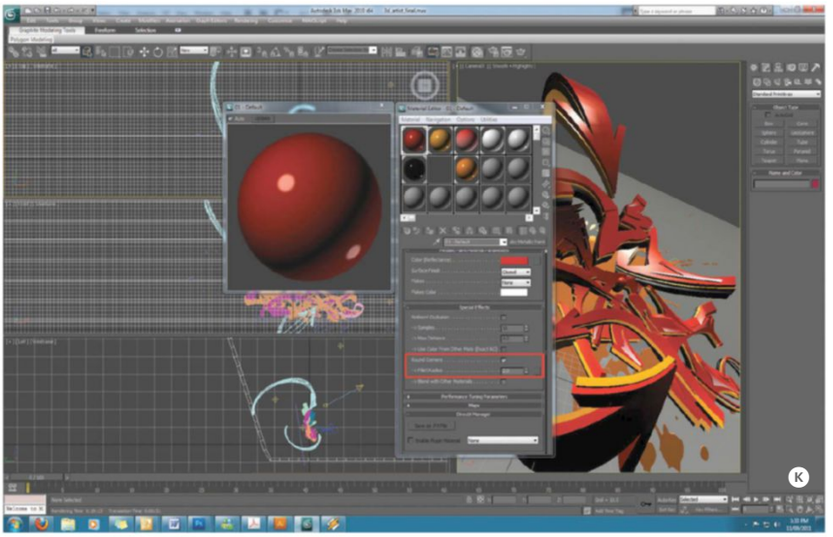
It's all about style

For me, it all comes down to having a solid understanding of graffiti lettering and understanding techniques that writers use to add their own personal style to their work. I have been looking at graffiti ever since I was a kid and have gone through heaps of sketchbooks trying to understand my own style.

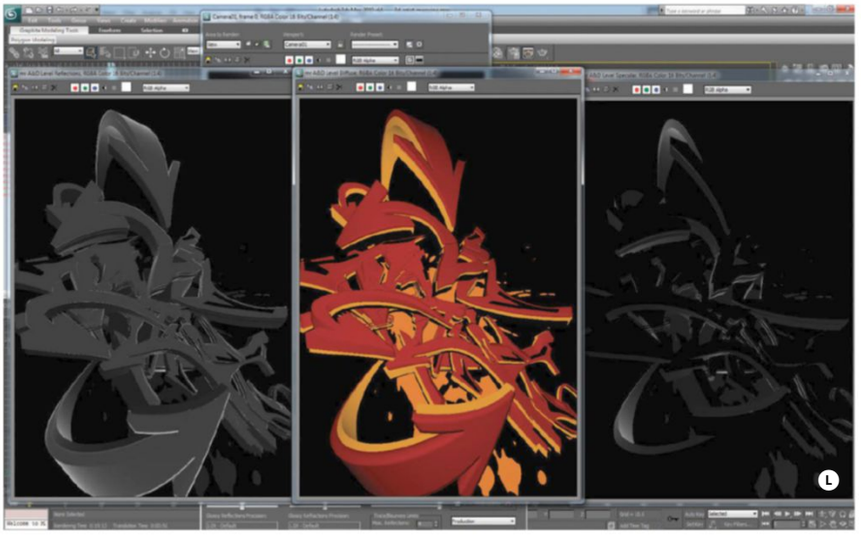
In terms of translating graffiti to 3D, I have found the best results come from pure experimentation with the tools and getting far away from how you've done things in the past. Some of the best writers have a fluidity to their style that is hard to achieve when you are locked in rigid techniques or workflows.



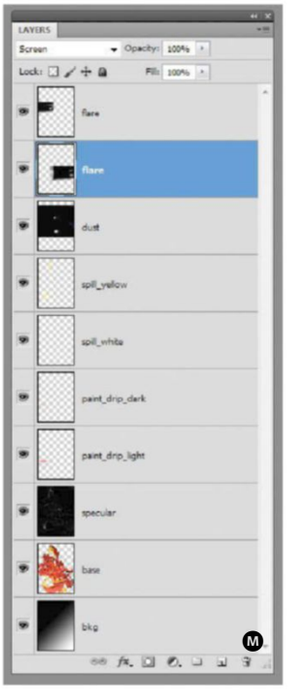
10 Extras I try to get away from my original idea and mess around with the layout one last time before getting into texturing and final render passes. Simple things like moving parts of the lettering or increasing the size of different elements can make a big difference to the vibe of the work. I think of it as a mass of shapes at this point and try to get a sense of a balanced composition – in this case, the flow of the lettering in the diagonal and the two big arrows (top and bottom) that balance it J.



11 Materials and colour There are no secrets to the materials and I generally keep lettering to flat colours as messing around too much with complex textures can make the work all blend together. Working with a very limited colour palette of four hues at the very most (I use Kuler sometimes to get an interesting palette) also keeps the text clean. The base material for the red was a Metallic Paint and I added the special effect Rounded Corners with a Fillet Radius of 2. I find this effect a bit hit and miss, but when it works it can give you nice, sharp lighting effects on the edges K.



12 Render I generally render out diffuse, specular and reflections passes as 16-bit TIFFs if they are being printed or PNG if it is just for screen. This image is rendered with Final Gather and Global Illumination turned on. I also added a white plane under the text so light bounces up and reflects on the underside of the lettering. I keep all the generic render settings – the only thing I might change is any anti-aliasing options so that the edges aren't jagged L.



13 Composite in Photoshop In Photoshop I try to keep it as simple as possible by adding a few flares and dust to give light effects that are hard to get from a 3D render. I dust the hotspots by either taking the light value from the specular or reflection pass, or just copying the brightest parts and blurring then on a new layer. I also make sure my reflections have enough contrast and stand out as it seems to make a big difference to the overall feel of the work M.

Artist info

Finnian MacManus

Personal portfolio site
http://finnmacmanus.com

Country USA

Software used
CINEMA 4D, Photoshop

"I tried to create a fusion of chaos and beauty – a hectic composition – but where all the elements fit together. Kind of an abstract representation of my mind when it's at work"

Finnian MacManus, *Consciousness,* 2011

Modelling
Lighting

Create fluid creatures

Bat/Snake/Eel Frozen Juicy Creatures 2011

Three semi-stylised splash shapes sculpted into the forms of moving animals are taken to the next level in 3D software, developed from their real-world clay concepts

Ferdi B Dick is a 3D generalist, animator and illustrator

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Ferdi B Dick

3DArtist online

Username: disko

Personal portfolio site
www.disko.co.za

Country South Africa

Software used
Houdini, ZBrush

Expertise Having studied design and illustration at Stellenbosch University, Ferdi specialises in illustration and animation focusing on concept design, 3D sculpting, shading, rendering and effects

This tutorial will utilise a variety of tools in ZBrush and Houdini in order to sculpt a quirky figurine. The workflow is flexible; indeed the best way to work here is fluidly.

In the step-by-step guide example I've also included a basic concept sketch that I used as a starting point, thereafter using Plasticine clay to explore the shapes, getting more hands on. The Eel and Snake figurines did not even have a concept drawing, evolving entirely out of the clay.

For the 3D phase of the process, I combined the strengths of ZBrush and Houdini to model the shapes in 3D. I opted for ZBrush for its ability to add character, while Houdini was selected for its precision and ability to work with a mesh that's easy to update and modify.

In the final stages of the tutorial, I will reveal the tricks to achieving optimum effects with the subsurface-scattering shader, as well as the steps taken to illuminate my juicy sculptures.

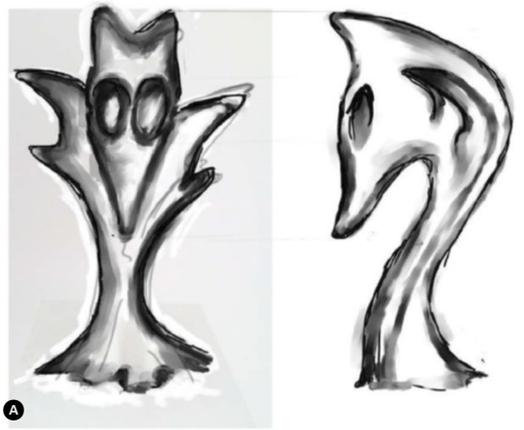
Concept

The concept started with the idea to make a bat-like gargoyle made out of juice... why? Don't ask! Maybe because I wanted to make some cool candle holders for my dining table!

Ⓐ Original concept sketch of Bat

Ⓑ Plasticine clay model of Bat

Ⓒ Clay sculptures of Eel and Snake characters



Ⓐ

01 Quicker is better

For the concept sketch I decided to spend no more than five minutes making a very rough drawing in Painter with my Wacom tablet. It's important not to worry too much about how the final drawing will look at this stage; instead think more about the basic shapes and lines that you're creating Ⓐ.

02 Play time

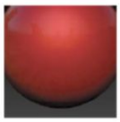
I started out by playing with Plasticine modelling clay for this stage of production. First, I got a few blocks of MDF measuring up at 80 x 80mm and 18mm high from my local hardware store – this is a random size selection, by the way. I painted the MDF with cheap white acrylic paint and these blocks were used as a base to sculpt on. I then started experimenting with Plasticine using just my hands and a palette knife Ⓑ.

03 Intuition is king

At this point I'm not worrying about detail, just exploring the fundamental forms – and having a bit of fun! This is how the Eel and the Snake figures came to be, simply inspired by playing around with the clay. The great thing about this medium is that you can re-use the plasticised modelling clay later to explore shapes for another project, so it's very eco-friendly. Starting off with a tactile object gives me the ability to be more intuitive and get a very direct sense of shape and proportion Ⓒ.

Ⓒ

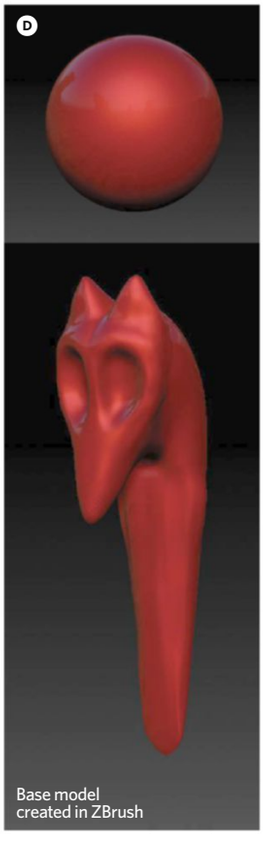
Ⓑ



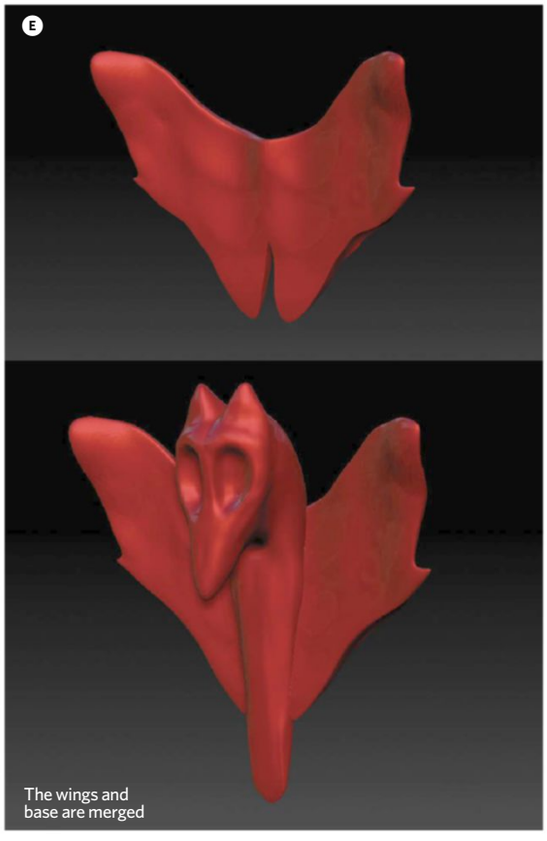
Clay to 'ZClay'

Take the real clay models into ZBrush

32mins render time
Resolution: 1,080 x 1,920



Base model created in ZBrush



The wings and base are merged

> You don't have to follow the concept design exactly – try to sculpt without staring at the concept drawing; you might just improve on the original shape

04 Start with the basics

Now we begin the 3D phase of the project. For the character part of the model I started off in ZBrush with a default sphere. You don't have to follow the concept design exactly – try to sculpt without staring at the concept drawing; you might just improve on the original shape. I quickly laid down the main base shape using the Clay and Move brushes D.

05 Grow some wings

The wings were also created from a sphere, but as a separate object, as I wanted to be able to manipulate their position independently. Once this was done I merged the wings and body and re-meshed the model, honing some of the details, especially where the two meshes met E.

06 House cleaning

When I was happy, I manually retopologised the mesh to form a clean mesh with relatively decent poly edge loops. No animation was planned for this model but, all the same, I like to keep my meshes tidy F.

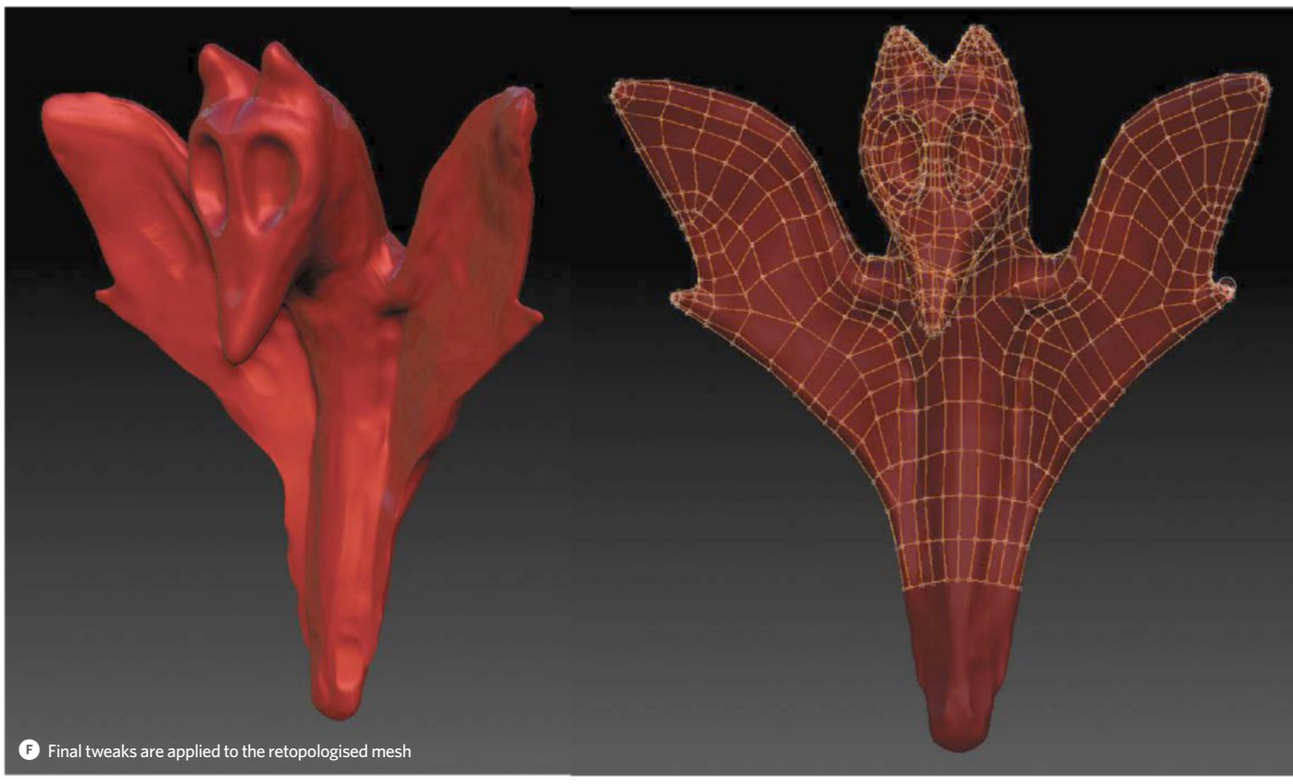
Problems & solutions

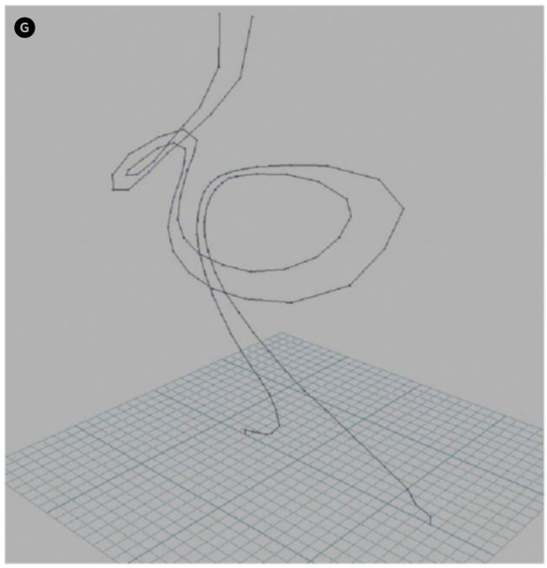
Exploring shape and form 'naturally' can be quite tricky on the computer, especially if you get caught up in technique.

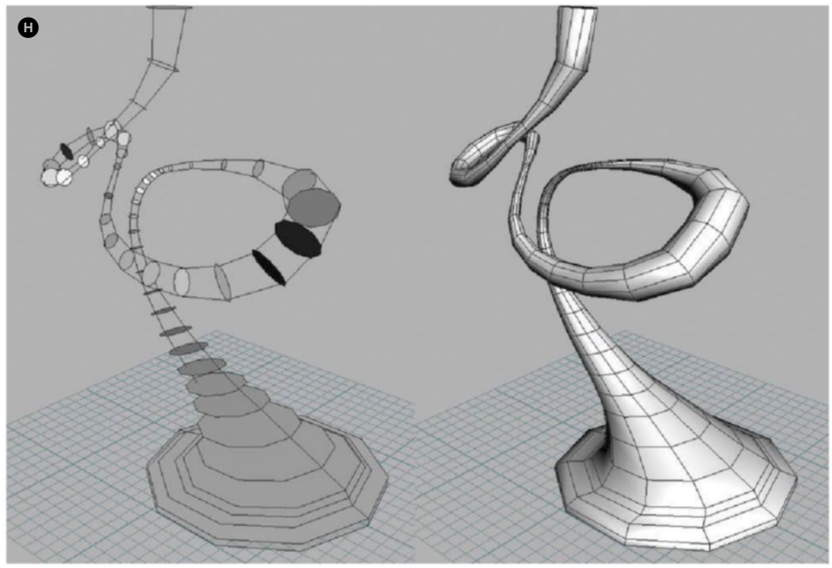
The rule of thumb for me is that it should be comfortable to change the shape at any time during the modelling process, which is not always possible but the ultimate aim nevertheless.

Yes, good planning and understanding of what you want to achieve is very important, but having the ability to explore and let the shapes evolve or grow beyond the initial concept sketch really gives them life.

This walkthrough shows where I have combined a range of different techniques to get some of that hands-on, exploratory approach back. This is by no means the way I always go about my 3D work, but – in a way – that's the point! You have to be flexible as an artist.


F Final tweaks are applied to the retopologised mesh





> I wanted to take more of a stylised approach to splashes compared to real-world water shapes, so even the base of the model was kept very symmetrical to achieve this aim

07 Plot the splash

I wanted to take more of a stylised approach to splashes compared to real-world water shapes, so even the base of the model was kept very symmetrical to achieve this aim. I started with the tail-splash of Bat in Houdini. I used a curved line to plot out the shape in my 3D view, rather than doing a concept drawing. Next the line gets copied and edited to form a kind of profile line G.

08 Skin the Bat

The two lines get merged then 'trail swept' and skinned to form the shape. Houdini's non-destructive procedural workflow enables me to make changes to this base curve and the final geometry updates – which is very cool. Note: this is not the best example of the amazing things you can do with Houdini, but it suits our purposes just fine here H

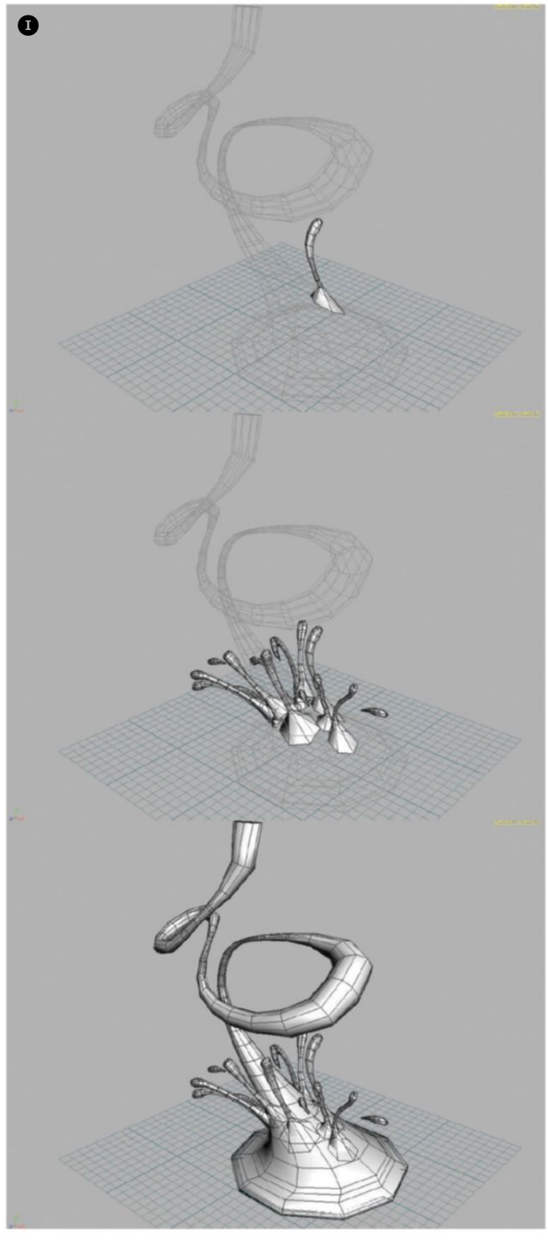
09 Splashing about

I then went on to make the smaller splashes using the same workflow and these were positioned as desired. The geometry pieces were 'Booleaned' together and then the mesh topology was cleaned up.

To avoid problems when it comes to subsurface scattering later on, you should check that all UVs show outward and that you have no holes or intersecting geometry; this is a good habit to get into anyway I.

10 Change views

I only choose my camera angles at the end of the modelling process as I like my models to work from all angles if possible. It takes a bit longer but it suits the way I work. It also gives me the ability to move the camera around as and when I please.



Reference images

It's always a good idea to get some reference images off the web when starting the shader. Better yet, go and buy some real juice, pour it into a glass and have a good look at it under the light, then take some snaps for reference later. This will help you to get a better sense of how much light passes through juice, and what elements are needed to make it look 'fresh'. These references are also useful even if you don't intend on creating a photorealistic result.

The new Mantra material library in Mantra 11 has a very nice built-in Subsurface model; read the help file if you are unfamiliar with it. I also added a bit of Noise displacement to break up the smooth surface and add a bit of 'natural' texture. Try to avoid high-specular reflective highlights in this case.

G Designing the splashes with lines in Houdini

H Trail sweeping and mesh skinning in action

I Placing splashes and cleaning up the UVs

Artist showcase

Ferdi B Dick

Currently based in Cape Town, I'm a self-taught 3D animation artist who goes under the persona Disko. My first love is creating richly textured 3D illustration. This includes 3D modelling, animation, compositing and postproduction. I strive to create raw, experimental and creative work from concept/preproduction straight through to the final product. Visit http://disko.co.za for a better overview of my work.

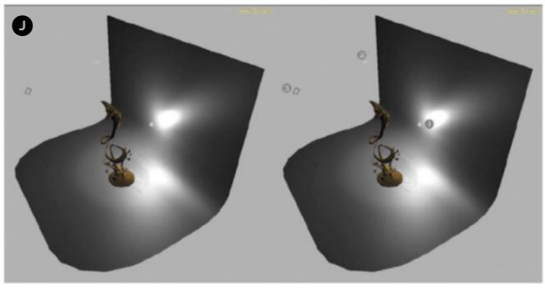
Picknick & Maggie **Houdini, ZBrush (2010)**
What started as a quick 3D model of my pet Scottish Terrier evolved into this 3D illustration of a pet cemetery! All the pieces were sculpted in 3D and all textures were hand painted; only the distant background is 2D

Cookie Monster Yellow & Pink **Maya, ZBrush (2009)**
Some crazy cookie/cupcake monsters are destroying the city, just for the hell of it! The Yellow Cookie Monster was created for an exhibition and also to experiment with 3D illustration techniques

Easter Bunny **Houdini, ZBrush (2010)**
This Easter Bunny is jealously holding on to its Easter treasure. This was a self-promotion image sent out over the Easter holiday

Nice and juicy

Breathe fresh textures into the figurines



Know the tools

Keep on broadening your skillset in order to find the best techniques and prevent your workflow from becoming hampered or tired. This doesn't necessarily mean learning whole new programs, but perhaps understanding common tools in greater depth. Of course this comes with experience, but be willing to step outside your comfort zone so that you can grow.

J A Point light, two square Area lights and an HDRI map illuminate the scene

K Take your time and play with light settings until satisfied

L Here are some of the image passes that were used for the final compositing

> Don't despair if you don't get the right look straight away; there is no 'magic' setting when working with subsurface scattering... it all depends on light intensity, falloff and geometry thickness

11 Lighting

When working with subsurface scattering, start with your main Point light placed behind the sculpture and work forward; switch off all lights and only work with the backlight. When you have a decent amount of shades of brightness showing through the model, start adding other lights at the top and front of the scene J.

12 Light balancing act

Start with very low light intensity and build up as required. Too strong an intensity front light will cause you to lose the backlighting carefully established in Step 11. Don't despair if you don't get the right look straight away; there is no 'magic' setting when working with subsurface scattering. You have to experiment – it all depends on the light intensity, falloff and thickness of your geometry. Lastly I added an Environment light with an HDRI image to add a bit of natural light and colour; again, I used very low Light Intensity (0.1). Note, you might have to dull your other lights to compensate for the Environment light K.

13 Compositing

An extra Subsurface Scattering + mat pass (1), along with Occlusion (2), Environment Reflect Refract (3), Refraction (4) and Reflection (5) passes were rendered out. These were used to tweak the final render, but very little was done in post. I try not to 'save' a project in post – it should be pretty much perfect by this stage L.

"I like to use CINEMA 4D because it's simple and direct. I created three spotlights, made the type with NURBS, and duplicated all the letters to make a type block. I exported in .psd format to use in Photoshop"

"When you finish any typography art you [should give] some time for your mind to understand that it's final. Some typography pieces you will never find an end to!"

Software used in this piece

Photoshop CINEMA 4D

The Dark Type 2011

I was inspired to create this image while studying typography. I talked with other designer friends and discovered that some have a kind of fear of working with type. I saw luxury and fear.

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Rafael Colussi Ribeirao de Freitas

3DArtistonline

Website www.behance.net/rafaelboo
Country Brazil / Canada
Software used Photoshop, CINEMA 4D

Masterclass

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Tasty treats are a-brewin'

Cooking up realistic fire

Master of photorealism, Joseph Harford, teaches us the fun behind creating fire and smoke simulations in FumeFX

When something is familiar to us, we spot inconsistencies and problems more quickly. The first step with a scene like this is to analyse reference material. You can spend a day looking through images of fire, smoke, ash, burning wood and learning the way wood burns – it's this attention to detail in every step of the process that makes a great image. It's a beginner mistake to rush into the parts you enjoy most, but planning and preparation will speed up and enhance your workflow if you take your time over it. Once we've made our way through these phases then can we begin on getting to the fun part of making the fire and smoke simulations in FumeFX.

To start out, a good model is vital. Although modelling isn't the hardest part of this project, it is absolutely essential to be accurate. Through using reference images we made two types of firewood. The wood for the bigger logs was made from a box primitive. Just increase some segments, adjust a few vertices, chamfer the edges, add noise and voilà! Make sure you create an indent between the bark and the wood so later the separation between the two will catch shadows. The longer types of wood and cut branches are made out of cylinders. The stubs are made with simple polymodelling, using reference to see how the stubs stick out of the wood. It's important to keep them natural, and not pipe-looking. After copying the logs several times and making slight variations to the copies, arrange the eight logs in a realistic stack. This model will serve us with the base to build up to with textures, materials, and then lighting. No matter the quality of these parts you can't get away from a poor model, so take your time and make sure it's of good quality.

Probably the second most important aspect of this scene is the texturing. It's easy to over-simplify and think that burning wood just has a charred texture. However, the only parts that look charred

are the parts that have already been completely burnt. Next to those parts are bits of wood that haven't yet burned but are dirtied by soot, and also parts where the fire has stripped the colour and texture of the bark away but has not yet burned the wood underneath. The scene also contains a wall and a floor, so we need to texture those as well. We imagined an old brick wall that has seen many fires already, so is covered in soot and worn. The same applies to the floor, a sense of history in all the scene objects will give our image more depth and life.

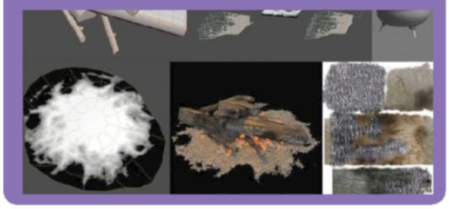
Every object has to be UV unwrapped also in order to create a proper texture in Photoshop. Tileable or procedural textures just won't cut it here. Mixing several textures together, with heavy use of masking, clone stamp and blending modes, we have a realistic texture. It's quite a common misconception that you need to be super experienced to create good unwraps or good textures, as there are really only a few techniques that are needed. The quality comes from your own observation, patience, attention to detail and when you are ready to say 'It's done'. We can also use Mudbox to paint directly onto our model, which makes the process of painting soot and burn maps much easier. The key to making a dirty and worn scene like this look realistic is showing all of the different texture and colour variations. Just a few of the logs and wall in our scene use more than 30 different textures.

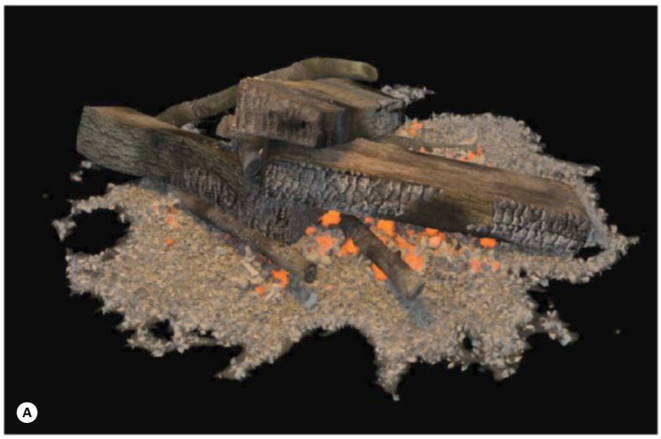
For the flames, smoke and steam we are using FumeFX 2.1. This plug-in is very powerful, easily adjustable and is suited for almost any kind of visual FX simulations. You can find lots of different types of fire on the internet, but creating a realistic (and animatable) looking fire is harder to achieve. Whenever you attempt to re-create a natural phenomenon, it's always more complex than initially expected. However, proper planning and preparation can limit the problems we face down the line.

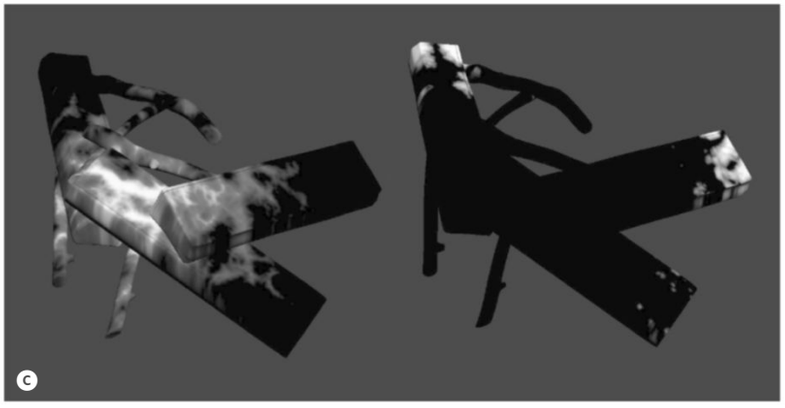
For creating the final image, we need to break down the FX we need. We require three different simulations. The first are the flames themselves. The second, from studying reference images, is a small amount of smoke coming from the ends of the logs. And the third simulation is the steam coming from the pot. Now let's see how it's done.

Deceptive nature

When starting a still life or a natural scene, it's often easy to fall into the trap of thinking it will be a simple endeavour. A few pieces of wood, a pot and some fire rapidly turn into days modelling and texturing, displacement maps, charred wood and soot materials and thousands of particles to consider. Make sure to factor the true amount of work there is involved and your time management will benefit.







A The ash piles up in the middle of the logs, and disperses outward

B The particles' setup

C The source maps for burning

D The container for our simulation

Steam

The settings for the steam rising from the pot are almost identical to the settings for the smoke. Just copy the container, reduce its dimension and place it just above the pot. For source object I used a 0 polygon high, non-renderable cylinder. Realism is all about subtlety, so don't go overboard.

Creating the FX

The ashes beneath the fire are quite complicated to make. A displacement or bump alone will not provide a realistic enough result, especially in such high resolution where the camera is so close to the fire. Moving toward the centre of the fire, the ashes have more and more of a glow and are made up of bigger particles, and these are the key. Particle systems are very fast and flexible, and therefore are quite a good method for creating realistic ash. I made three different particle systems that had 2-4 different sized particles with different properties. Let's take a look...

01 Base ash

The basic structure was the same for each system: one small hill-shaped object was the emitter, with a black-white map to control the position of the particles. We apply a surface offset to add height to the ash and more randomness. The emitter object should be higher the further into the fire it is, to give the effect that there is more volume of ash. As it gets further away the layers of ash are thinner, so the emitter object should be too.

We should make some instance objects to represent the ash particles. These are heavily deformed planes and boxes. We'll now apply a huge variation to these to get a more random effect. With the random 3D-type rotation operator I added even more of a chaotic feeling. In the next step you can see the particle system used. A

02 Adding more ash

The smallest particles are on the edge of the fire. They're numerous and don't emit any glow. If an image contains lots of one object, it needs to be diverse to remain realistic. We'll use four different objects with four different materials. The objects have light grey fractal noise colours and the opacity is driven by a radial gradient with noise applied, so each particle looks like there are more surrounding it.

We use the same method to make the medium-sized particles. For this material we blend two materials. One of them is the light grey standard material, and the other is an orange V-RayLightMtl. For mask we use a big scale noise to achieve the effect that part of the ash is glowing while the rest has burned away. Particles were bigger in this area and had less variation in the scale. We have to modify the source map as well, because they were now sitting closer to the centre of the fire.

Large scale ashes must have fallen from the log onto the pile of ash, so we should also create this effect. A noise map controls the blending between the two types of materials, but now I used a smaller scale noise to have more parts glowing. B

03 Fuel source maps

To isolate the fire from the smoke we need to use black-white maps. Wherever the map was white, the fire would burn or smoke would rise, and wherever the map was black, no effect would occur. To achieve this the radial gradient we created earlier with noise applied is very useful. A good way to apply this is to select all our objects in question and apply a large UVW map, planar from the top. C

04 Flames

FumeFX simulations use a 'container', which contains the simulation. It's good to make this the outer borders of where our simulation will run. From the Create > FumeFX menu, create a new container and make it the size of our fireplace. We haven't got much to set up a lot of things to have a basic simulation, but for this phase the most important thing is to have interaction with the scene objects and to set the sim up to use the source maps.

Because now we will simulate only the fire in the simulation tab we can uncheck the smoke simulation, so with this we can save up some space on our HDD. The quality and maximum iterations should be decreased at this stage to give us a faster simulation to adjust. D

05 Adjusting the sim

After this, in the Obj/Src tab, add the wall, the pot and the FumeFX Object source. For the object source add all the simulation wood,

and into the Fuel map turn on 'source from intensity' and copy the fire source gradient as an instance. So fuel will come out only where the map is white. In the viewport we can easily set up where we want these white areas. With this we build up the basic simulation. If we run this now we can see how the flames are rising from the white parts of the logs and get interaction with the pot and the walls.

Now we can refine the simulation settings to have the desired result. This is usually a personal taste in which you prefer to see on the final image. One of the most important things is the size of the flames. This is why we will get a realistic result. E

06 Big or small flames?

We can adjust the height of the flames with the Object Source Fuel amount. In our case the value is 26,238. This is closely related to the temperature dissipation under the simulation panel. This value controls the height of the flames; the larger the value the higher the flames will rise. In our case a value of 2.0 is good, because it makes the top of the flames reach the middle of the pot. Next comes shaping the flames.

We can also adjust the shape under the simulation tab. In the system panel the vorticity value controls the overall movement of the fire. The higher the value, the more the flames 'dance'. In our case the value is 0.8. F

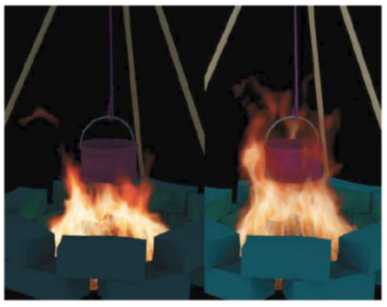
07 Wind and turbulence

Because this is an open fire we have to factor in the wind's effect on the movement of the flames. With the turbulence parameter we can control this noisy wind effect. Be careful adjusting this value, because even increasing the value in small increments can increase simulation time a lot. A good turbulence level for our fire is around 0.75. Underneath we can play with the turbulence noise parameters. If you have any kind of turbulence in your simulation it's recommended to increase the detail value to 5.0 to have a more detailed turbulence effect. The frames value shows you a kind of frequency for the turbulence. The lower this value the more nervous the flames will be, so they will move much faster. G

Smoke

Duplicate the container from the fire, as we just need to alter the settings for the smoke. Smoke is also affected by the same wind turbulence, so we can leave all parameters in the simulation tab where they are. Just turn off fire and enable smoke for sim and rendering. On the Obj/Src tab disable Fuel mapping and turn the fuel amount to 0, and at the smoke choose 'source from intensity' again for the map. Copy the radial gradient with the noise as an instance to this slot. Smoke will only rise from the parts of the source map that are white. Run a default simulation and a wavelet sim for additional detail.

E Adjusting the basics



F The size of the flame matters

08 Wavelet power

This detail might be enough for a small resolution image or a video, but probably won't be enough for a high-res render, so you should probably run a wavelet turbulence simulation as well. Switch the sim. mode to wavelet and take a look at the WT-P tab. Wavelet is an additional simulation that will use your default simulations voxel values to add much more detail. This is important because overall simulation times can be reduced and less memory is needed for higher simulations. You can decrease the spacing for a better quality result now, and increase the grid detail of the wavelet. H

G How wind and turbulence dramatically affect the fire

H Harnessing the power of wavelet

09 Flame rendering

It's worth playing with the flame rendering settings as well because they will have a huge influence on the final image. It's important to switch the cache to wavelet, so we will see the high-detailed flames in our renders. Decrease the step size % so that your render will be finer. In the fire panel it's very important to turn the fire colour to key mode, so that a gradient will control the look of the fire. The left side of the gradient will take effect on the outer parts of the flame while the right side will effect the inner parts. Usually the inner parts of campfires are white, and the outer areas are yellow, orange and dark red. I

I The gradient gives you control over the colour of the fire

10 Postproduction

As with almost every image I make, I'll take it into Photoshop or After Effects and spend time adjusting things that were too time-consuming to do in the render (ie colour correction and general 'tidying up'). I enhanced the contrast, created a more dynamic camera view, added noise to the bricks and more texture to the pot and harmonised the image in its value composition. A few hours here in post can save days upon days of hard labour in 3D. J

J Save time and enhance quality with good post work

Mastering glass & liquids

“In this Masterclass, we’re going to take you through rendering and lighting a glass of beer – one of the most requested but often avoided subjects in CG – using 3ds Max and mental ray”

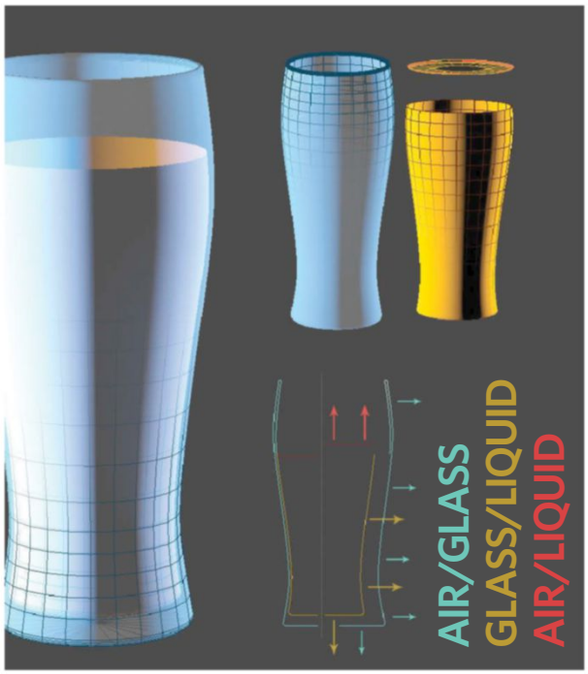
Lighting and rendering glass and liquid in mental ray

It's an often-avoided subject in 3D – rendering glass and liquids – especially in a studio environment. Reflections and refractions must be carefully set up to convey the form of the object. Too little and the object is lost in the background and left flat. Too many and it becomes busy and confused. As with creating most objects – natural or synthetic – it comes down to a few steps: observation, re-creation and perfection. We need to observe what is happening, work out how things are interacting with each other and what has shaped that object over time. The next step is to re-create it in 3D, which includes the modelling, texturing and materials. It's crucial to get this step right, as even with the very best lighting, if the model and materials are not right, the final image will not be photorealistic. Part of this step is translating the object into the software you use. For mental ray users, this means the glass and liquid must be constructed in a particular way for the refractions to look convincing. See the 'Breakdown of the model' boxout for a bit more information here.

Photography can teach us many things that will aid in our quest for creating ultimate realism in our CG work. I would recommend anyone interested in producing photoreal work to get a camera and set up simple studios in their home. There are many sites on the internet that give great instructions on creating DIY ring flashes, softboxes and studio lighting setups out of cardboard boxes, tin foil and cotton sheets. It doesn't have to cost too much and the hands-on experience you get adding lights and reflectors will transfer over to lighting in 3D.

Creating the foam shader

To create the foam, start with a subsurface-scattering material as a base; this is essential for selling the translucency. Paint a map that looks like many orbs of differing sizes, but make sure none of them overlap. We use this map as a tiled bump, reflection mask and SSS colour by patching it through colour-correction nodes. The trick is to duplicate the original map and alter the tiling. Then use a blend material with a large Noise map for the mask to blend the two together for added randomness. Painting our own mask gives us the option to 'paint images' into the bubbles. Use the tiled bump as a displacement to also improve reflections.



Breakdown of the model

When creating the glass and liquid in mental ray it's important to model them in a specific way, as shown in the image. It must be split up into three different surfaces. The reason for this is the way mental ray deals with refraction. It's not possible to use the overlap or gap methods; instead the surface where the liquid touches the glass must be deleted. We call the different surfaces 'interfaces', which are surfaces with materials that visually describe the interfacing media, for example air/glass, glass/liquid and air/liquid. To get the correct IOR for each surface we divide the outer media by the inner media:

- Air/glass interface IOR=1.5/1.0=1.5
- Air/liquid interface IOR=1.33/1.0=1.33
- Glass/liquid interface IOR=1.33/1.5=0.8.

More information is available in the A&D material help files.

In photography, there are tricks that make dark studio setups better and easier to manage come the time for postwork. Many skills are transferable and can be improved upon in 3D software. In photography, we can place a glass sheet on top of a black box, with the top and back of the box cut out. This way we can see straight through the glass onto the background, keeping black all over and giving us a nice reflection on the floor. We emulate this by modelling the same box, floor and background, but instead of a glass material we add a Matte/Shadow/Reflection material. In the Camera Mapped Background slot, we add a Transmat shader – essentially making it see-through, while retaining our reflections.

The more you learn about traditional photography techniques, the more you can experiment, translate and push them further in your CG scenes. There is a wealth of non-digital information out there from years of study that we can use to expand our knowledge, so take advantage of it!

Creating the glass shader

Coloured glass can be created in mental ray using the Arch&Design shader in one of a couple of ways. One way is to simply change the Transparency Color to the desired shade – a dark green, for example. However this does not take into account the thickness of the object and will result in less-than-realistic results. The alternative is to use the Advanced Rendering>Transparency>Color pushed to the Max Distance. Set the distance to the width of your liquid and then change the colour swatch to the desired shade. There will be quite a lot of trial and error rendering and checking how the colour matches your references, but the results will be worth it.

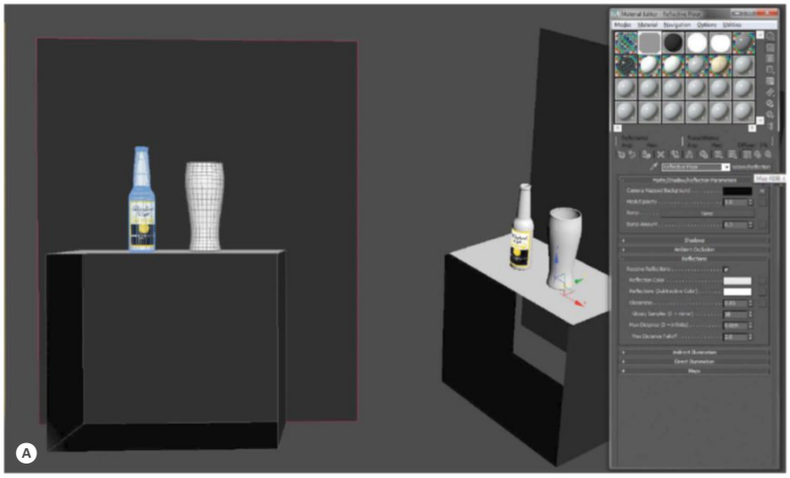
Creating the beer shader

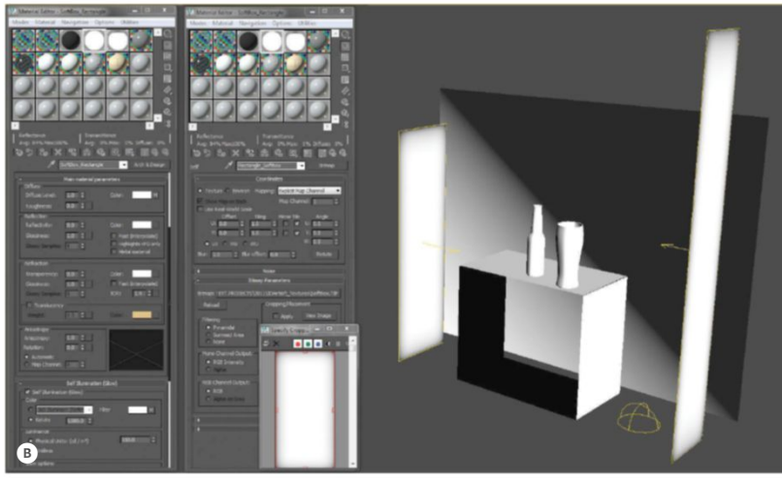
The beer shader is actually very similar to the glass, with the notable exception being the lack of reflections. There is no need to have them on the liquid as they wouldn't really be seen and they would take more time to render too. The Transparency Color obviously needs to be changed to a dark brown and the Depth tweaked to match the size of the beer.

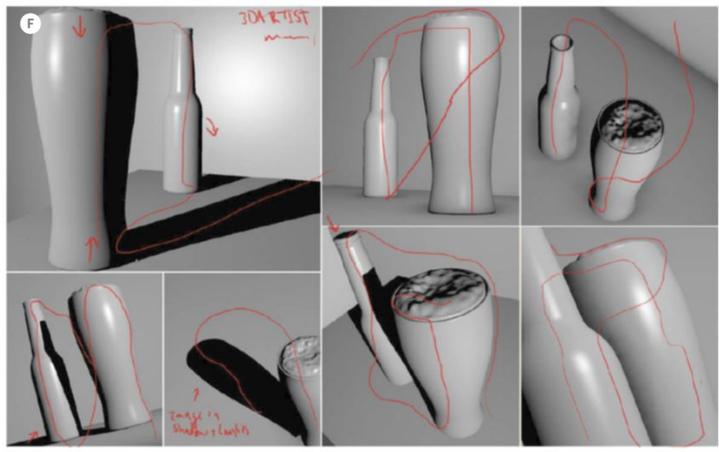
Balancing rendering time with quality

Highlights in an Arch&Design material take extra time to render, and sometimes it can be enough to just simply turn them off and use real reflections. As reflections are the ones we are concerned about, we recommend lowering all samples, keeping Final Gather on Draft and Anti-Aliasing Samples on Low. If you need to see the final quality then push the settings back up to High, change the Render Type to Blowup and the image size to 200 x 200, and render just a small part.

To start off it's important to have a good-quality model. As noted in the boxout, the inner surface of the glass touching the liquid must be deleted. However don't just delete these faces; use the Delete Mesh modifier. That way we can switch it on and off and render just our glass alone if needed.







A The bare bones of our studio

B The softbox shader and texture, although you can use any type of shape and softness you like

C You can move the planes back and forth and adjust their size to fit the object's size

D The light shines up through the beer and picks out the colour, especially in areas where the glass curves

E The softboxes shine through, giving shape and interest to the liquid

F Choosing angles and composition

G Particle settings. They 'die' when they reach the top of the glass

H Foam material and displacement settings

A pint-sized adventure...

01 Set up the studio

We start by setting up our scene as we would in a real studio. However we can simplify it. We add a box to house the underlight, cutting out the back and top. Add a floor plane on top with a Matte/Shadow/Reflection material and a Transmat in the Camera Mapped Background slot. Now Add a background plane and name everything accordingly (A).

02 Add the lights

Add in two mental ray Skylight Portals on either side of the object. Set these to a value of 50 each and make sure they are pointed at our object. You can duplicate one and then hit Flip Lux Direction to create the other. Create two planes that match the size of the Portals and link them to the Portals. These planes will be assigned a self-illuminating texture that is designed to look like a photographic softbox. Now we add a Lights>Skylight with a value of 0.01, which will not add much light in itself, but it will enable our Portal lights (B).

03 Paint with reflections

Now render and see where the highlights are located; note that the liquid is black currently, but that will change when we light it up. These planes pick out the sides of our object, which brings it forward from the black background. It's important not to 'lose' the side edges into the background. With larger objects like vases, a bigger highlight is better, however with a pint glass, thinner highlights work better (C).

04 Pour the beer

Now we've picked out our glass, we can unhide our beer model, and enable Delete Mesh. It can be useful to rename this modifier to 'Filled with liquid' or something similar to help you remember. Our beer will be black initially, and we have a number of ways to show the colour. One is to add translucency to the beer shader, and place a light shining up from below it (D).

05 Light the beer from the inside

Lighting the beer from below and adding translucency can only take us so far, so now place a new softbox behind the beer, but so it's not seen by the camera. This can be tricky, but luckily in CG we can go to the object's properties and hide the object from the camera. This softbox will light our beer from behind so, to create the most pleasing image, adjust the size, softness and shape. It's nice to have the centre vibrant and the sides darker, as if the beer had its own internal light source. However if the beer is a clear, bubbly one, we can forgo the backlight and use the reflections off the thousands of bubbles to depict the beer colour itself, making the sides lighter (E).

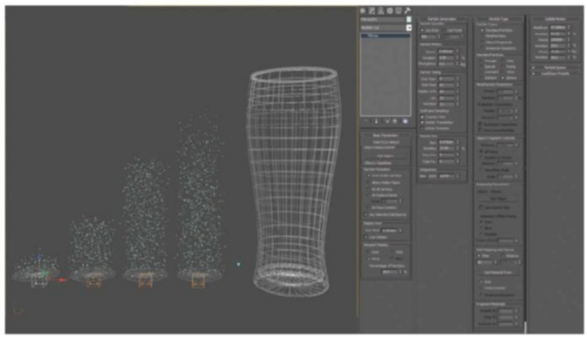
06 Composition & camera

Finding a composition and a good camera angle largely depends on the aspect ratio. We wanted to go for a vertical image, so we

Add detail to the glass

To add further detail to the glass and increase the realism, make sure that the Diffuse Color is set to white and Transparency to 1.0. Now add a smudged, fingerprinted, scratched map to the glass's Refraction Color. Any area of this map that is set less than white will give the glass less refraction, essentially giving the glass an 'unclean' appearance in those areas. I would advise not going over the top here as it can quickly become unrealistic. The map can also be fed into the Reflection Glossiness slot, which works particularly well for simulating the grease left behind from our fingers after handling it.

G



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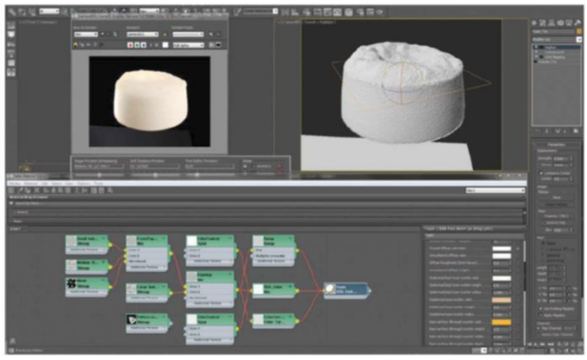

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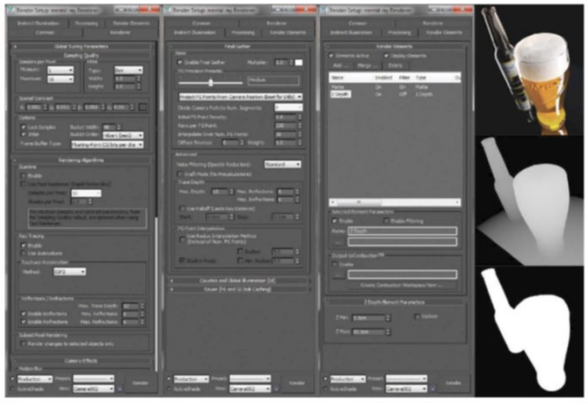


I Almost there, but our render settings must be optimal. Render and optimise each object on its own to find minimum settings needed for the highest quality

> A welcome addition is to add particle bubbles… [as] they catch highlights and colour and also increase the realism

went for a top-down shot, focusing on the glass. Look carefully at the image in the viewport and balance the forms in the space. There are many rules and guidelines for composition, but sometimes it's enough to stand back and feel the balance of the image – a skill well worth developing. We are looking for things like the way the positive and negative space are filled on the page. Are things cramped? Is there enough vertical space? Do the colours clash? Does the lighting focus our eyes on the subject? How long does the image hold our attention? What is the speed of the image – ie how fast do our eyes move around it, and is that the aim of the piece? All these things do have 'rules', but over time, you will develop a sense for them F.

07 Particles

A welcome addition is to add particle bubbles to the glass of beer; they catch highlights and colour and also increase the realism. You can push this as far as you want, as the behaviour of the bubbles is entirely dependent on the state the beer is in – ie how freshly poured it is. Use a PArray and copy the settings in the image; we can use a low-poly sphere as instance geometry. Make sure you add variance to the scale, otherwise things will look too uniform G.

08 A foamy head

We recommend separating the foam into two sections: a base and a top. The reason is so the top can be masked to add random larger bubbles, or even logos shaped by the bubbles. Remember, as the bubbles in the base model are pushed up against the glass, we need to invert the displacement and bump H.

09 Rendering

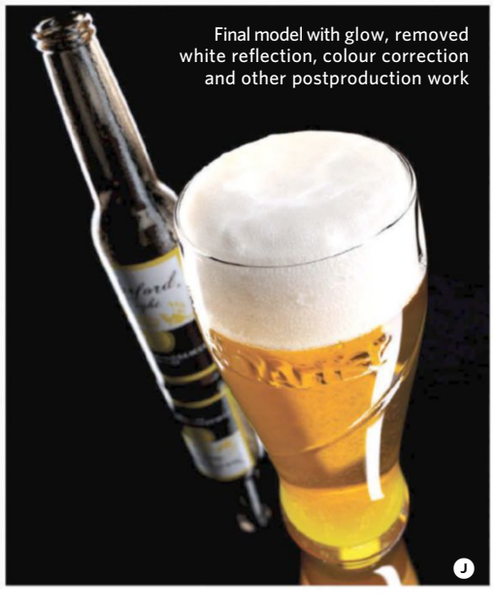
For the final render we need to adjust all our settings to a higher quality. The main ones are Anti-Aliasing, which can be set to High, and Final Gather which need not be higher than Medium. Make sure to go into each material and, if any have glossy values below 8, increase them; 16 should suffice as none of our objects have particularly blurred reflections/refractions. It will later be useful if you also render a ZDepth pass, which you can use for effects like depth of field, fog and controlling brightness, saturation and contrast levels in the composition I.

10 The final hurdle

Most images rendered straight require some degree of postwork, whether it be simply adding glow, contrast or complete retouching and background replacement. It's not only advised but it's essential for saving time on tight deadlines. There won't always be time to make sure all areas and colours are perfect; some things are much easier to fix in post.

As in photography, sometimes lighting and rendering elements individually, and piecing them together in post can save many hours' work as well as create a much more compelling image.

As a final step, we use our ZDepth render to calculate depth of field. Photoshop's Lens Blur filter uses an alpha as the depth source and is very versatile; we can also adjust our lens aperture shape and size to best effect. And we're done – the next round's on you J!



Final model with glow, removed white reflection, colour correction and other postproduction work

J

White environment

To render in a white environment we need to change just a few things. Naturally we will want to change the floor and backgrounds to a white shade, but also our softboxes and backlight now become black reflection cards. Instead of building up our lighting with reflections, we are starting from a fully reflective and bright setup and subtracting light and reflections with our black cards. A white environment also gives you the chance to incorporate shadows onto the floor, which when coloured can offer a range of interesting compositional opportunities.

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MARI is a great tool for creating complex creature textures in a very flexible way

Creature texturing in MARI

> MARI provides a great deal of power and flexibility for interactively painting textures on very high-resolution models by enabling us to break down models into a number of texture patches that we can paint on simultaneously and seamlessly

When creating high-resolution creatures, the texture detail we apply will go a long way towards selling the look of various surfaces. MARI is a great solution for interactively painting texture maps and it allows us to create high-resolution maps for very dense meshes. MARI provides a number of valuable painting tools and enables us to break up our textures into manageable chunks with a very flexible multi-patch workflow. While this ability to work with such large data sets makes it very useful for highly detailed projects, it can work equally as well on a variety of smaller-scale projects.

For this tutorial, we broke our UV layout into a number of texture tiles. In MARI, these tiles are called 'patches'. We can work with all of the patches at once or modify each patch individually. This separation enables us to set the size of each patch independently – so we can set the patch size for the creature's face to 4K, but set the size for the eye's patch to something smaller as it requires less detail. In this way we're sure to have just the right amount of texture space available to capture needed detail.

Texturing works in MARI by projecting paint onto models from a paint buffer. We can think of this paint buffer as a piece of glass which is resting above our model. We can add paint to this invisible plane using any of our brushes, apply photographic elements and even warp the paint around. Once the paint on this plane is ready, we can simply project the paint down onto the creature's surface. This process is called 'baking'.

When baking paint from the paint buffer, we need to make sure we change the bake behaviour to a setting that is appropriate to our workflow. The Bake settings can be found in the Projection palette, and they define how the paint from the buffer is transferred onto the model. We can set our paint to automatically bake and clear the buffer as we move around the model. This AutoBakeAndClear setting makes for a smooth workflow where we can paint and quickly move around our model. Alternatively, if we would like to have more control over the paint buffer or be able to re-project detail from the buffer we can use the Manual or Clear Only settings. These behaviours are important to set and remember so we don't get unexpected results when working with the buffer.

When painting the various channels in MARI like Diffuse Color, Bump or Specular, we need to have some way of visualising the effect of those channels as we paint. Shaders will let us do just that. Shaders enable us to set up our channels to display in different configurations so we can really see what we are working on. For instance, we can set up a particular shader to display our Diffuse map as the colour, our Bump map as a bump and our Specular map as specularity as we paint. In addition, we can also create shaders that display our Bump or Specular maps as colour, so we can better visualise the detail we're painting. We could also have a shader like the Default shader that will simply let us view whatever our current channel is as colour. Switching back and forth between these multiple custom shaders is simple, so we can quickly see our textures in different ways to really speed up our production.

We can also use a familiar multi-layered approach as we paint. For instance, we can create a Diffuse channel and lay down some basic colour on our creature. We can then create a second Diffuse channel to start painting more specific skin detail. To view the combined effect of these textures, we can layer them together within our shader – just simply add a new shader module and choose a Diffuse Blend. We select our second channel and then tweak the Blend Amount and Blend Mode settings to see the effect of these two combined channels. We can also take this a step further and incorporate masking.

Because we're using projection painting, we do have to be conscious of texture streaking. When we project paint from the paint buffer onto our creature, faces that point straight at us receive the paint correctly. However, paint will appear elongated as the angle of incidence of the faces starts to increase – for example, as the mesh curves around the side of the leg. To combat this effect, we can use edge masking. This will reduce the influence of paint in areas that are facing away from our view based on particular falloff settings. So, as the paint approaches the edge, it will have less and less of an effect.

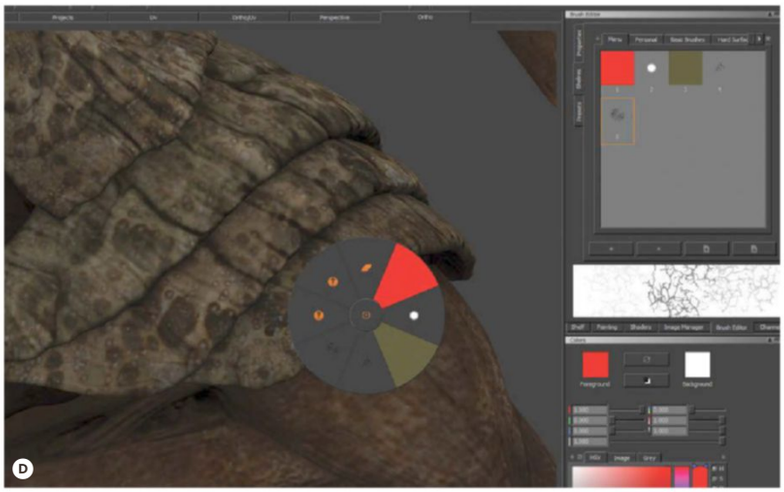
When painting organic creatures, we find it often helps to incorporate real-world photographic detail into the texture. For instance, we could use images of various insect shells that have interesting detail and incorporate those into our textures. By including elements of existing images in our textures and using them as a jumping-off point, we can quickly build up more realistic creature surfaces.

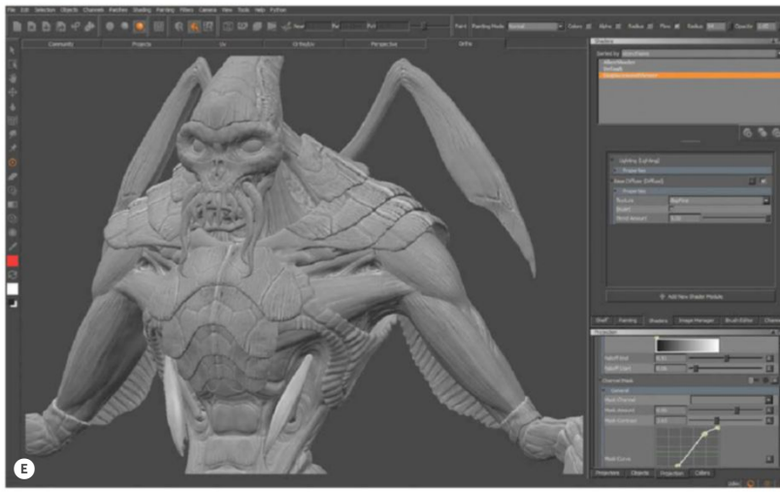
MARI is a great solution for painting creature textures not only for massive geometries or models that require multiple high-resolution tiles, but also for a wide range of models. Now let's take a closer look at some of the specific steps involved in painting organic textures in MARI...

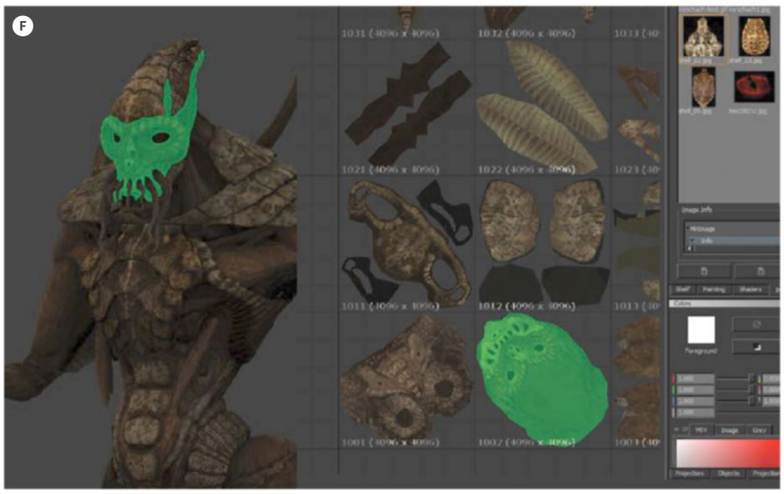
A The render of our alien lifeform before any paint has been applied in MARI

B Making use of a Diffuse channel to block in the initial colour

C A reflection pass of our creature which will help to build up depth







D We can save commonly used items to shelves and access them via the pie selector menu

E We can toggle between multiple shaders to view our channels in different ways

F Multiple patches enable us to create more detailed textures by breaking down the model into sections

G Paint won't adhere to masked edges displayed in red. The gradient shows the mask falloff

MARI texturing tips

01 Set up the workspace

When texturing in MARI, it's often a good idea to put commonly used colours or brushes somewhere easily accessible. We can use the Menu shelf to save colours (by dragging from the Colors palette) or brushes (by hitting the 'plus' button) that we use frequently. Further, if we name these numerically, between 1 and 7, we can access them even more quickly by hitting F9 to activate the pie selector menu D.

02 Using custom shaders

Setting up custom shaders enables us to view our channels in specific configurations. For instance, we can set up a shader to display every channel in context, just as we would like our finished product to appear. We can also use shaders that simply display our current channel as colour to get a better idea of how our maps are shaping up. By switching back and forth, we can quickly see the displacement as colour, then displacement again. Shaders also let us change ambient lighting, ambient occlusion and specularity properties E.

03 Working with patches

Patches are the individual texture tiles we will be painting onto our model. A 3D model can consist of a single patch or multiple patches depending on how the UVs are arranged. These patches can extend in the U and V directions and they let us dedicate more or less texture space to areas of our models. Modifications can be made to each tile individually and each tile can have its own resolution. Even though our model is broken into multiple tiles, MARI paints across them seamlessly creating multiple textures that combine to produce the desired result F.

Object versions

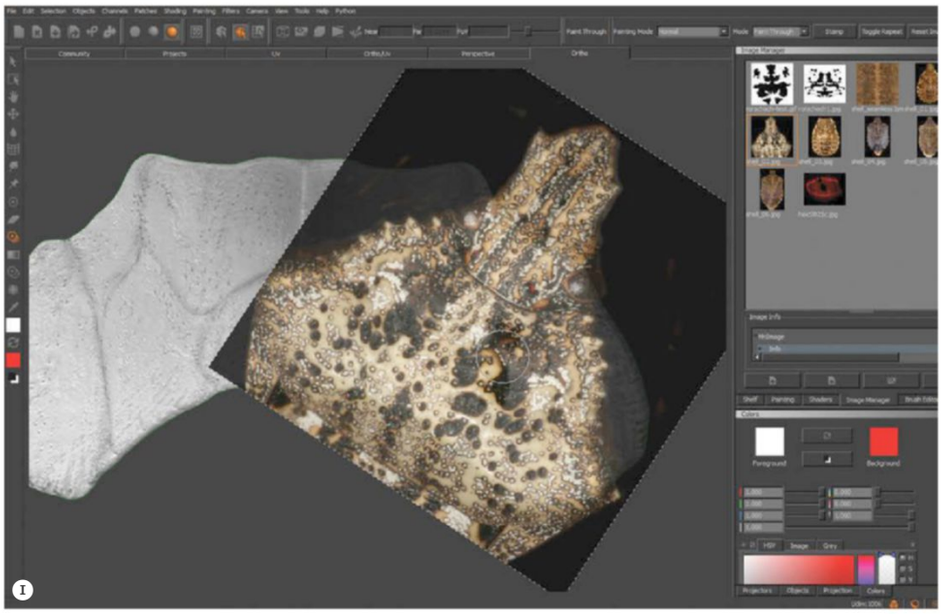
It's possible that after we begin creating our textures, the model may get modified. Topology may change, pieces may be added or parts may be resized. To import a new version of the model, we can right-click on the object in the Objects palette and choose Add Version. We will then be prompted to select a new object. We can view all of the versions of a model, rename them or delete them. Keep in mind that, if the UVs are different, some of the textures may need to be tweaked.

04 Streak-free texturing

Edge masking in MARI is a powerful way of avoiding streaks as we project paint from the buffer. We can activate edge masking from the Projection palette. The Falloff settings determine the angle at which the model ceases to be affected by paint and a region of falloff from no influence to full influence. We can see the edge mask by enabling the Mask Preview checkbox at the top of the Projection palette and choosing a preview colour. We can see the mask as a glowing edge that updates automatically as we orbit around our creature G.

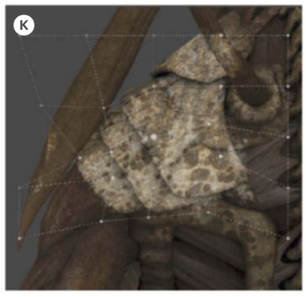
05 Try painting in the UV view

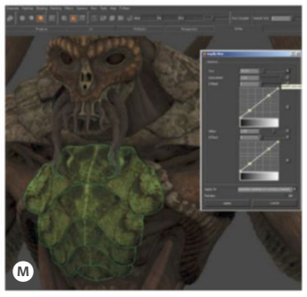
In many cases it's easier to paint on flattened versions of our 3D models. MARI makes it possible to paint in the UV view, just as you would in a 3D view. So for parts of models like tentacles, bent limbs or areas that are difficult to get to, painting on the flattened UV image instead can save you a lot of time and headaches H.



MARI 1.3

The newest update to MARI includes several powerful features that make the creature-texturing experience even better than it already is. Ptex enables us to paint high resolution without the need for UVs. The resolution for these per-face textures is large enough for any project. In addition, we can get a better look at the effect of any Displacement maps as we paint and we can combine numerous tiled textures to make the workflow even more flexible. We can also create texture versions using snapshots and preview models that are reflective using environment maps.





H For hard-to-reach areas we suggest painting on the flattened UV image

I Painting through photographs enables us to incorporate real-world detail into our maps

J Setting up our shaders allows us to work with multiple channels non-destructively

K The Spline Warper lets us warp paint on the buffer based on a grid

L Here the Displacement channel is being used as a mask but any channel will work

M We can adjust entire channels or individual patches as we are doing here

06 Incorporate some real-world detail

Using photographic elements in our textures can enable us to quickly get a realistic look. We can bring any images we want to use into the Image Manager. We can then use the Paint Through tool to rub parts of the image onto the paint buffer. From here we can paint over parts of the image or combine it with portions of other images to build up effects. Once we're happy with it, we can bake down the result. Remember to work any imagery you use so it all flows together nicely I.

07 Blend multiple channels

For a really robust painting experience, we need to take a layered approach. In MARI this can be achieved by the way we set up our shaders. To blend a texture of spots with the underlying skin, we can add a Diffuse Blend shader module. We can also bring a mask into the equation by adding a Masked Diffuse Blend module. This will enable us to define exactly which areas of our second channel are being blended with the channel below and which areas are ignored. Masking lends us a very flexible and non-destructive workflow J.

08 Modify the paint buffer

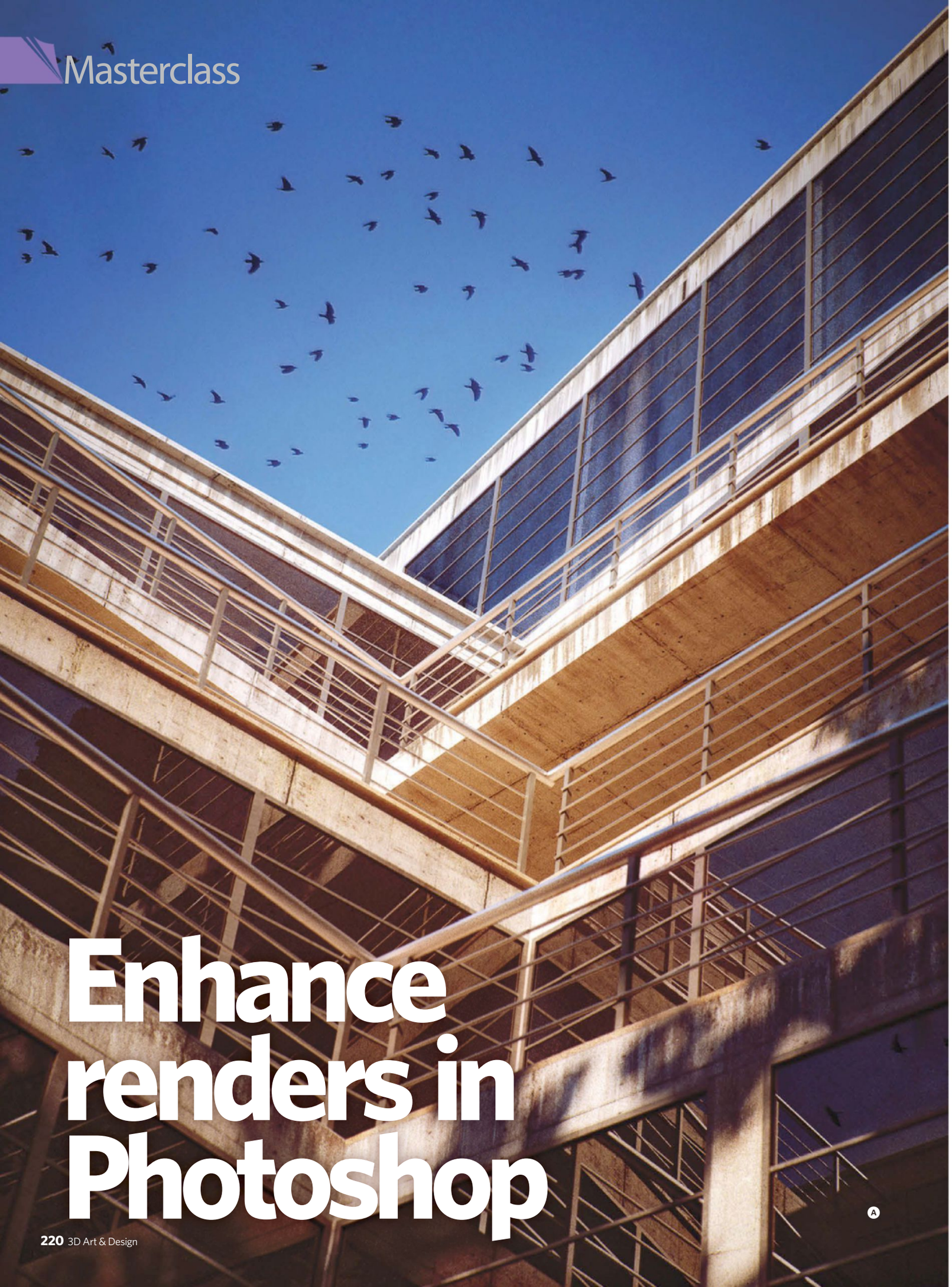
The detail may not match the underlying geometry when painting onto the buffer and especially when painting through existing photographs. MARI has several tools for warping and modifying paint on the buffer before baking. We can use the Slerp tool to interactively push and pull paint around on the buffer. The Spline Warper allows us to use a grid to deform the paint, while the Pinup tool lets us pin areas of the buffer down while deforming other areas. These features are great for projecting creature heads or other elements that need to be modified to match geometry before baking K.

09 Use channel masks

There are several methods for masking areas as we paint. Beyond edge masks (see step 4), we also have channel masks. Activating the Channel Mask setting will let us input one of our texture channels to use as a mask. By changing the mask settings and/or mask curve we can define how the image is used to mask the model. Even if we choose not to turn on Mask Preview, as long as the mask itself is activated, we will only be able to paint on unmasked areas. Keep in mind that we can use multiple masks at once too L.

10 Use filters to adjust channels

Once we complete the painting of a complex texture map, we need to have a method of adjusting that texture within the application. We may need to modify the hue, tweak the levels or blur the texture. By using the filters in MARI we can make all of these adjustments, and more, extremely quickly. There are a number of filters that can be applied to individual patches or whole channels, depending on your needs. Simply choose the filter you want from the Filters menu, set the filter and select how to apply it. Don't forget to turn on the preview to see the result before applying M.



Enhance renders in Photoshop

A

> Render passes give us tremendous possibilities for post-processing – we can enhance texture and relight the scene

In this Masterclass I'll be covering the topic of image manipulation and some post-processing techniques I personally use in my projects. For me, postproduction is probably one of my favourites stages of production; it really helps add something special to final renderings. Many of these effects are either too time consuming, or even impossible to create in 3D applications. While not everything can be done using Photoshop, many image enhancements can be quite quickly added this way.

When working with raw renderings, I find it very important to plan my work and split the whole process into two stages. The first one is focused only on the rendering manipulation, and the second is on colour grading and creating the specific 'look' of the final picture.

Some of the methods used in the first stage are very similar to the post-processing techniques used in traditional or digital photography, thus it's very, very helpful to read various articles and tutorials regarding this topic.

Lift from photography

One of the post-processing methods used in digital photography that may be handy in rendering manipulation is called 'bracketing'. In general, bracketing involves taking several photographs of the same subject using different camera settings. This way we receive a set of pictures with different exposure values – some of them are very dark and others are too bright. By having a wide range of light setups, we can merge our photographs for a picture with very uniform shading. It's a method similar to HDR photography, but gives us much more flexibility in digital environment as most of the rendering engines support saving the multiple outputs in many different exposure values.

After refining the basic tones of the image, I'd move to compositing and adjusting the render passes. Although I wasn't using many rendering passes while preparing this particular image, there's no doubt that render passes give us tremendous possibilities when it comes to post-processing. For example, we can completely remove the reflections from the rendering, enhance the texture colours, manipulate the individual elements or even change the UV layouts and relight the scene. Unfortunately, physically based rendering engines (like the one I've used in my example) support only the very basic render passes. Yet, it's still possible to mix the outputs of two different rendering engines – we just have to prepare separate lighting and material setups for each of them. It might be time consuming, but is very often worthwhile as it gives us good looking and interesting results.

Introduce extra elements

The next step would be adding the elements that weren't included in raw rendering. In architectural visualisation this may lead us to sky replacement, adding images of people, and so on. For example, in my picture I've refined the look of concrete elements by adding some imperfections using photographs in my resource library. This could be held directly in a 3D application, but I found it much faster to apply the images in Photoshop, rather to create another UV layout in 3D space.

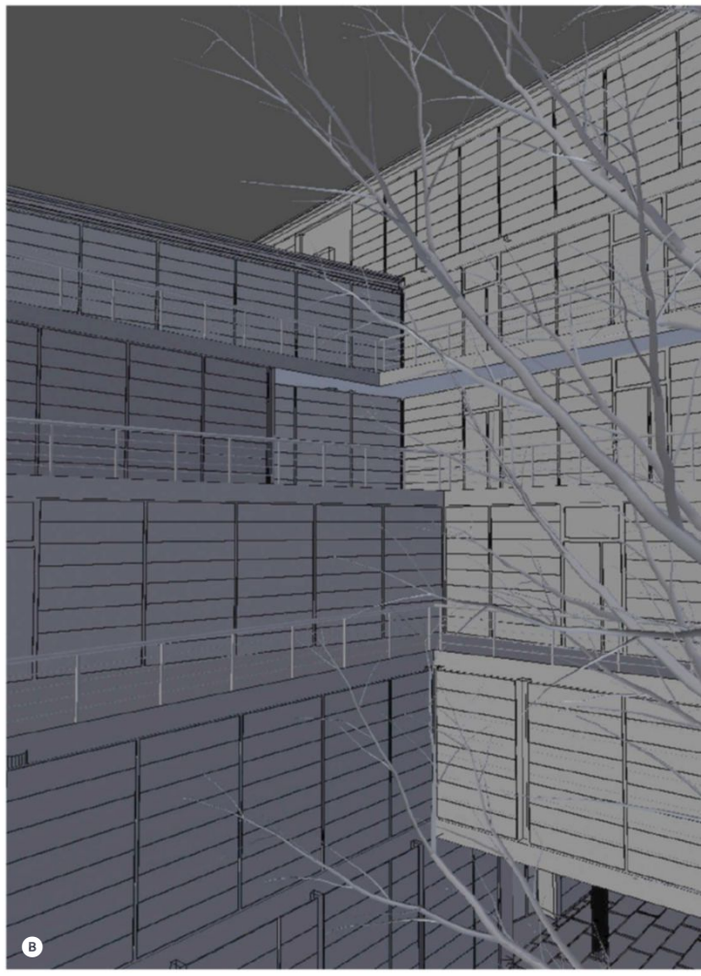
After adding all necessary elements and tuning the tint and saturation, I would consider the first stage to be finished. It's important to understand that before we move to colour grading, all the described steps were focused at processing the image to look as we would expect our raw rendering to look. This is why I've added all the details that weren't created in 3D space, and did only the basic tone and colour correction. Now, since I have the good material to work on, I can move to colour grading and setting up the right mood of my picture. As I'm sure you'll be aware, this is not the one and only way you can process your renderings – every artist has their own ways of achieving particular effects, so it's always good to observe others, learn from your colleagues and be open to new techniques.

Set the mood

The colour grading process seems to be easier than compositing and adding details to the picture manually, but it also requires more sensitivity and may be quite time consuming. Some people can do this intuitively, but for most this should be just the matter of proper practice and patience. I'd also recommend gaining at least a basic knowledge of colour theory for the post-processing results to be consistent.

I usually start by adding a slight lens vignetting effect to help focus the viewer's attention at the image's centre. There are various ways of creating this effect – I personally prefer adding an Exposure adjustment layer in Photoshop and painting it by hand. While working with the mood of our picture, it's really helpful to use some external Photoshop plug-ins. The one used while working on this architectural rendering is Nik Color Efex Pro. It comes out with many 'ready to use' setups that can be either adjusted, or applied directly onto an image. I prefer to play with various effects for a while and then also test their look with different layer blending modes – experimenting almost always gives me very interesting results. Not to mention that, we can also apply the effects onto previously created render passes and then try mixing them with the raw image for even more creative possibilities.

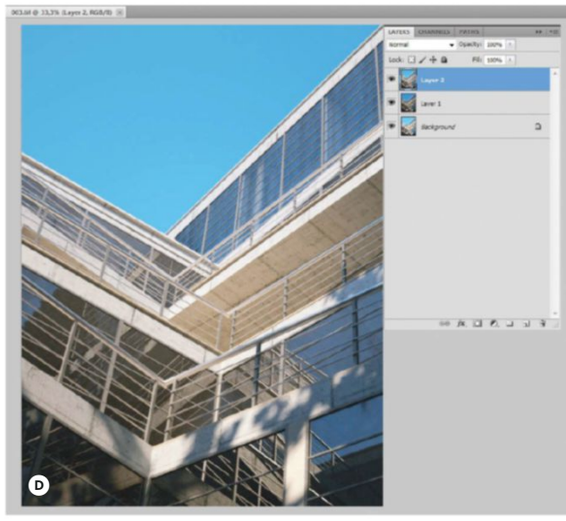
Let's now look at these steps in more detail and see how to accomplish them using Photoshop.

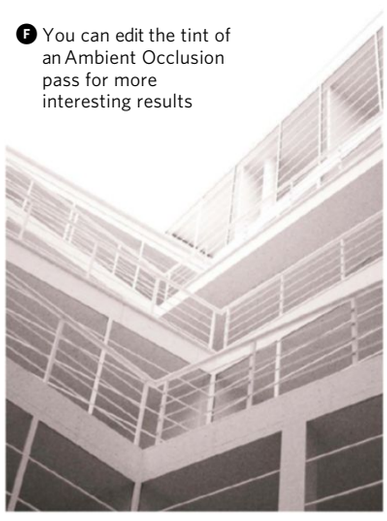


> By having a wide range of light setups, we can merge our photos for uniform shading

A The main image shows a conceptual conference building created in a 3D application, based on CAD documentation from a client

B A wireframe view of the main image





F You can edit the tint of an Ambient Occlusion pass for more interesting results

C Instead of having multiple pictures, we can export our rendering to OpenEXR file format and then use it for the same purposes

D TIFF files can also export layer layout from Photoshop within themselves

E Alpha channel is usually associated with an object's transparency or masking

Postproduction process

01 Merging images

Most of the rendering engines out there enable us to save the outputs in different exposure values. This allows us to merge the pictures later in Photoshop, brightening the dark areas of our image by using overexposed images and darkening some parts by underexposed ones. This way we can, for example, extract additional, very subtle details out of shadowed spots. You still need to watch out not to flatten the lighting and make the tone too unified C.

02 Saving your works

While working with raw renderings, always remember not to save your outputs as JPEG files, as its lossy compression file format and leads to various issues when post-processing. The most common are compression artefacts that can be very disturbing and require re-rendering the whole scene one more time. It's much safer to use TIFF or PNG file formats and the best option is choosing the format that contains 16-bit colour channel information (for example 48 bit PNG files) D.

03 Sky replacement

A JPEG file contains only three colour channels (Red, Green, Blue), but the PNG or TIFF file format also supports an Alpha channel that is used for masking out the sky or environment in our image. With this we can very quickly change the default sky setup in a 3D application and customise it freely in Photoshop. In my example, I've added some birds and darkened the sky a little bit to make it look more natural E.

04 Merging passes

As mentioned before, physically based rendering engines do not fully support rendering passes that are available for built-in, standard 3D application renderers. This doesn't have to be a problem as we can easily mix their outputs and thus achieve very interesting results. In my example, I've created Ambient Occlusion pass to enhance the details and give my models more explicit shadows F.

05 Adding imperfections

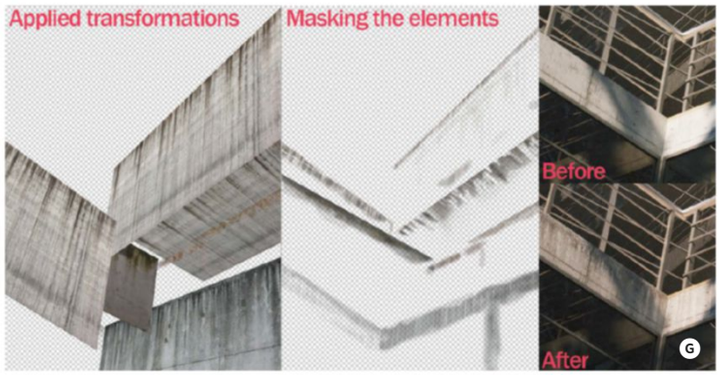
The concrete elements of my building seemed too perfect so I've decided to add some dirt all over them. I've downloaded some old concrete textures from www.cgtextures.com and then by using Photoshop's Transform tool (Ctrl/Cmd + T) and switching between Perspective and Distort modes, I've manipulated the images so they match the angles and locations of concrete slabs in the image. Layer blending mode was set to Overlay with Opacity decreased to 50% G.

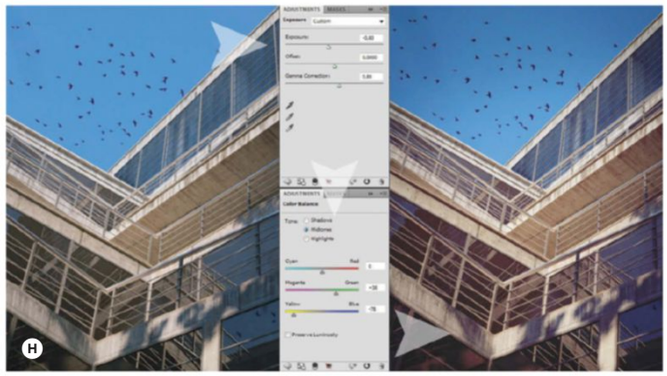
06 Tuning colours

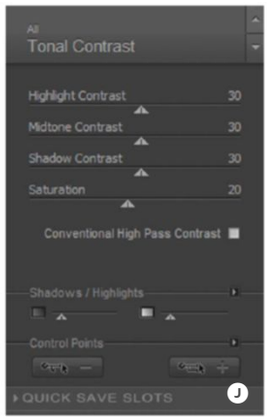
Before we move to final colour manipulations, it's good to correct our image the way we'd like it to look as a raw rendering. I'd begin with changing the overall tint of the picture by using a Color Balance adjustment layer. Then, by mixing

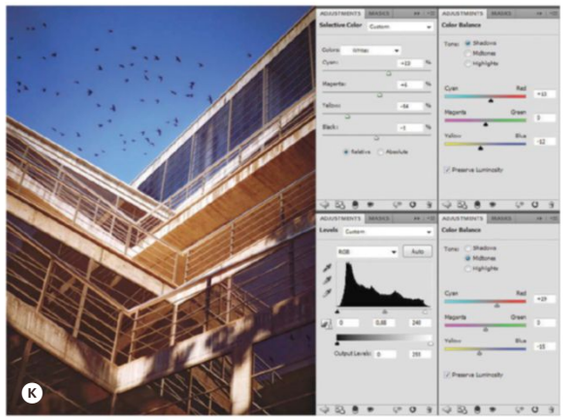
Using render passes

Render Passes (also called Render Layers) can be very helpful when editing your still image and are essential in digital film and animation pipeline. By using them we gain total control over the shot we're currently working on. Every aspect of the rendered image (reflection, lighting, shadows) can be saved as a separate layer and edited independently. By using more advanced layers like normal and point position passes, we can even relight our scene or change the texture UV layout after it was rendered.









differently set up Exposure adjustment layers, I'd finally tune the lighting mood of my picture H.

07 Working with plug-ins

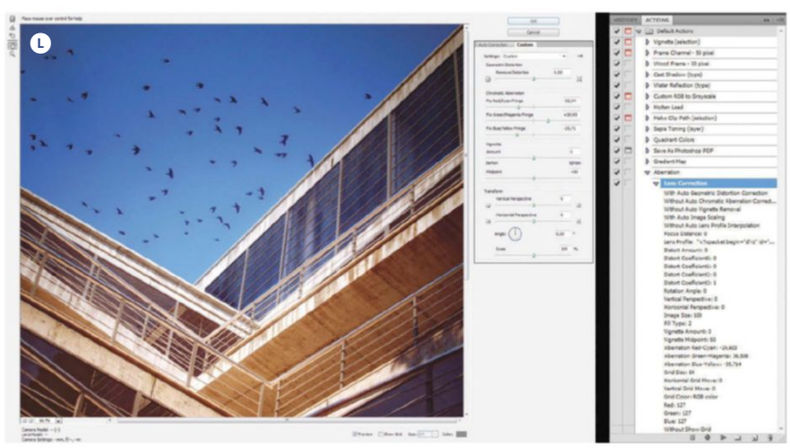
I decided to add a slight glow effect. Although Photoshop gives us a quite handy tool for creating this effect (it's allocated under Filter>Distort>Diffuse Glow), I've decided to use more advanced one which comes together with the Nic Color Efex Pro plug-in. After applying the filter, a new layer would be created with all our tweaks added. I've decreased the layer's opacity to keep the effect a little more subtle I.

08 Sharpening the details

Sometimes our rendering outputs seem to lose detail, so we can try recovering them by using sharpening tools provided by Photoshop or external plug-ins. Nik Color Efex gives us very powerful tool, which is called Tonal contrast. By using it we can sometimes recover even the most hidden tones from the textures applied in the 3D application J.

09 Creating the mood

Regardless of the effect I want to achieve, when it comes to final colour adjustments, I usually use only the simplest tools offered by Photoshop. By adding a Levels adjustment layer, I increase the contrast of my picture. Curves can be very handy when it comes to adjusting single colour channel values (we can for example re-create various camera film tones by using Curves), while Color Balance and Selective Color give us more possibilities of building up the final mood K.



10 Final touches

I've applied a slight chromatic aberration effect, created with the Lens Distortion tool. Don't forget if you're planning to publish your images online, it's usually good to decrease their size and save as JPEG files as they are very handy for preview purposes. Always remember to back up your works and the most useful 'work-in-progress' files. Even though it might seem useless to store gigabytes of data, you never know when it might turn out to be useful L.

8 and 16-bit image editing

When editing images in any software, it is highly recommended to work within 16-bit colour depth even though it might be quite challenging for your computer. A standard, 8-bit colour depth JPEG file offers us 'only' 256 shades of each colour channel (RGB), so we can reproduce roughly 16.8 million colour variations (256 x 256 x 256). It may seem a huge amount of possibilities, but is really nothing in comparison to let's say, 16-bit colour depth PNG file. Number of bits equals to digit 2 to the exponent 8 (giving us 256 shades in a JPEG file). In a PNG file, the amount of available tones per colour channel equals 65,536, giving us an enormous number of possibilities!

G After applying all the transforms, crop the image to its actual size

H All the imperfections and tweaks that couldn't be applied directly in a 3D package should be set up and ready

I Nik Color Efex Pro plug-in can be downloaded as a 15-day trial

J When your rendering result is quite noisy, extensive sharpening is not ideal

K Adding some blue tints in the Highlight tab of the Color Balance tool will almost always make the image look natural

L Some of the effects applied in Photoshop can be saved as automatic actions. This saves a lot of time

Compositing in animation

"Learn how to create a short animation by using very common and popular CG applications"

Digital animations have always fascinated me. As a child I remember my father taking me to the cinema for the very first time – the movie I saw was *Jurassic Park* by Steven Spielberg. While at that time I was more interested in watching the dinosaurs than marvelling at the visual effects, I still consider this as one of the most inspiring events in my life.

Nowadays, after more than 15 years of constant technological development, computer animation has been taken to a completely new level. Fortunately, the tools and technology became much more accessible, giving us great opportunities to create our own digital movies. What's also encouraging about this is in most cases we don't need the whole film crew or movie studio – current 3D and postproduction applications can sometimes give us even more than that. Another fantastic fact about today's digital technology, as you'll no doubt already be aware of, is that we're now no longer limited by the computational power of modern PCs. An average or even a small-sized studio such as mine (www.no-triangle.com) is able to handle the renderings and prepare the animated material for compositing within a decent time period.

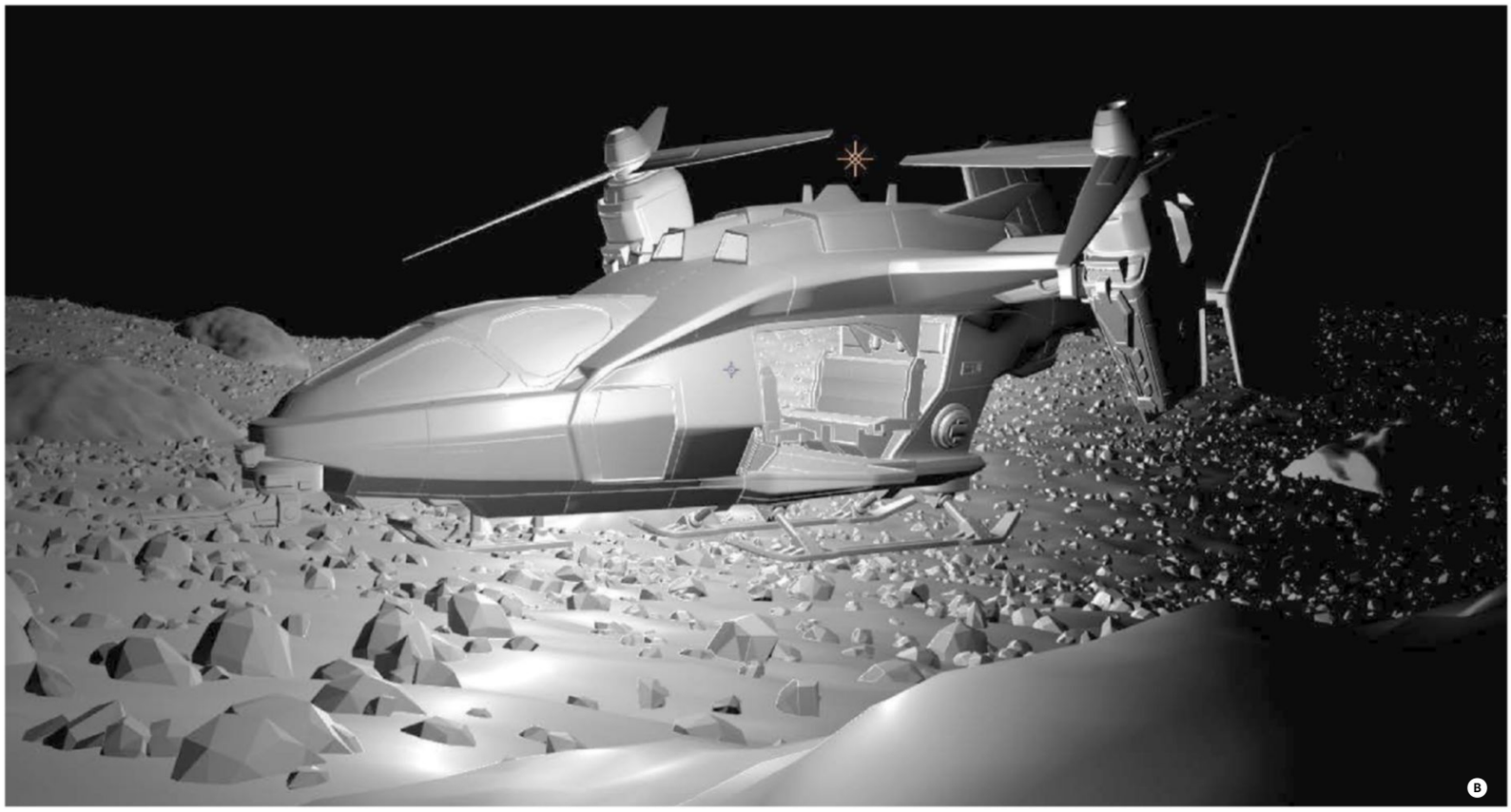
In this Masterclass I'll describe the process of creating approximately 20 seconds of digital animation. The scene shows a quick glimpse of the battlefield and an evacuating sci-fi aircraft. The main model was prepared by me some time ago while co-operating with Canadian director Jared Pelletier and working on the upcoming *Halo: Faith* movie – an unofficial, fan-based video production (www.halofaith.com). I was responsible for modelling the aircraft and thought it would be interesting to incorporate the asset into my own short animation. The other elements, such as the terrain, dust and smoke, were also created inside Blender and then later composited together inside After Effects.

I began by creating the aircraft movement and setting up the scene camera. First, I added the movement actions for turret, sliders and engines so I could easily modify them later. Next, I parented all the elements to the aircraft body, except for the rotors. The rotors were parented to engines, so they could inherit their axial rotation. Engines, in turn, inherit the movement and rotation of the aircraft body, so the whole model animates naturally. I still needed to put the rotors into their movement, so I decided to use 'transformation constraint'. I added a simple cube and linked it to each of the rotors. Then I transformed the cube's X-axis motion into the rotors' Z-axis rotation. By doing this I could control their speed much more easily.

Faking the reality

The most time-consuming part of working with digital animation is the rendering process. Fortunately, compositing applications give us possibilities of recreating some of the effects that otherwise would have to be rendered. For example, by using 'normal pass' which includes the information of direction each pixel in the image is facing, we can fully relight our scene in a compositing application. This picture shows an example of the object relighting technique, using a free plug-in for After Effects called Normality B.

Next, I moved to setting up the terrain. I subdivided just the simple plane mesh and used Blender's 'proportional editing' mode to form the landscape. I also created two sets of small and big rocks and stones – they were later distributed on the whole scene by using a particle system. By preparing the environment, I later moved to smoke simulations. To create smoke in Blender we need to add a domain object, inside which all the simulations will take place, and a flow object emitting smoke particles. In my scene there are four various simulations; one of the domain objects includes two flow surfaces generating the dust under the rotors. The other three are quite similar in domain setup, but have different heat and



density attributes, generating different smoke variations.

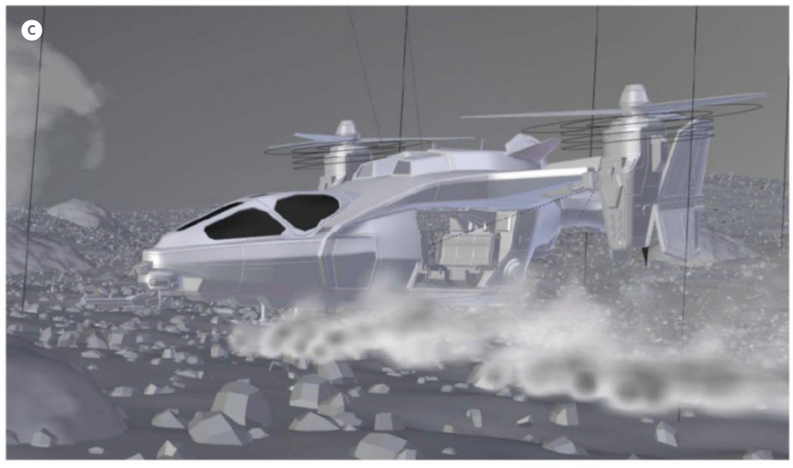
After setting everything up in the 3D application, I prepared the animation for rendering. As the project was very tight on time, I needed to find a solution that would enable me to render the most important elements quickly. I chose Octane Render because it uses GPU computational technology and in many cases gives very significant speed-up. I separated the elements and rendered the aircraft and environment independently. Smoke was rendered directly inside Blender, together with all other rendering passes like shadows, masks, motion vectors and z-values.

The next stage was taking all the rendering results into After Effects for final composition. By splitting the animation into separate elements we get much bigger control over the final look of our shot and don't need to waste time on additional renderings in case we'd like to tweak or change something. I began with matching the environment layers by tuning their tint, saturation and exposure. Then I moved to adding the smoke and fitting in the aircraft render. By using a z-depth pass, I created the atmosphere which gave the image more natural look. I also prepared another z-depth pass for creating the depth-of-field effect, but it turned out to work great as an additional shading method for my scene too. Some of the effects were created directly inside After Effects, for example the windy and dusty atmosphere. I used a solid colour layer with tuned 'fractal noise' effect and previously mentioned z-depth, atmospheric pass for that. With everything lined up, I also used some After Effects plug-ins. First was ReelSmart Motion Blur Pro for giving the rotors and the whole image more natural movement. Second was Magic Bullet Looks, which works great when it comes to final colour setup and grading. It comes with a very interesting, built-in library of cinematic effects – you can either use them or build your own setups from scratch!

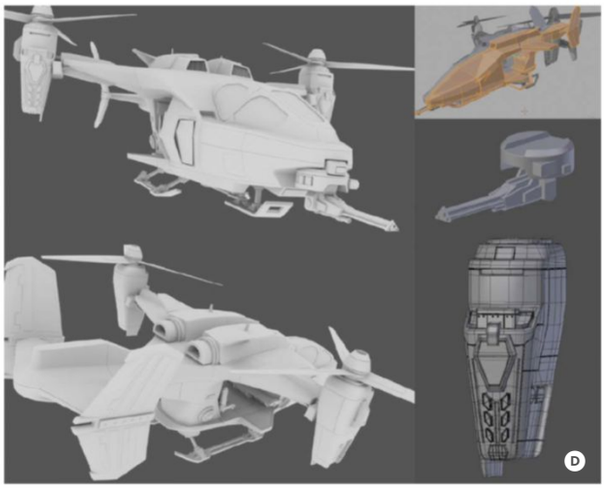
The last step involves exporting the animation to a decent file format. The method I personally use in most cases is exporting a PNG or JPG sequence out of After Effects and later using free tools like VirtualDub to save the animation as a movie file and process it with any required codecs. Of course, we can use more common formats like QuickTime and save our results directly from After Effects. However, this may result in some quality issues and it's always better to have raw, unprocessed animation frames at your disposal rather than rendering the whole sequence one more time.

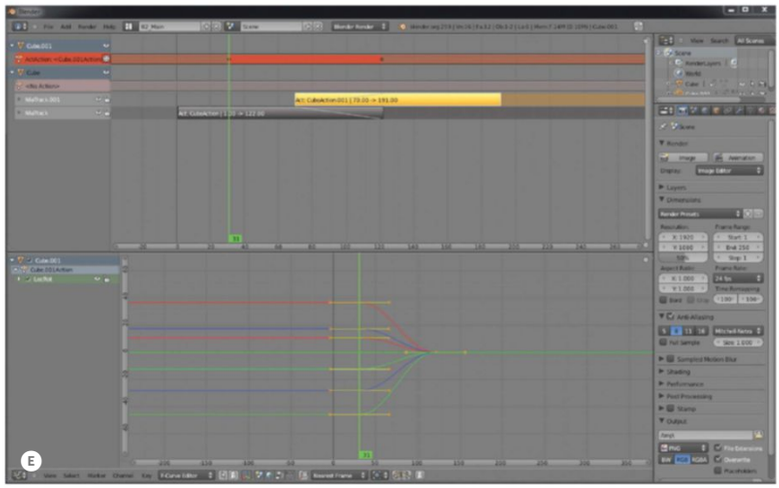
A The increased capabilities of present-day software and hardware means digital animation is achievable and accessible for many artists

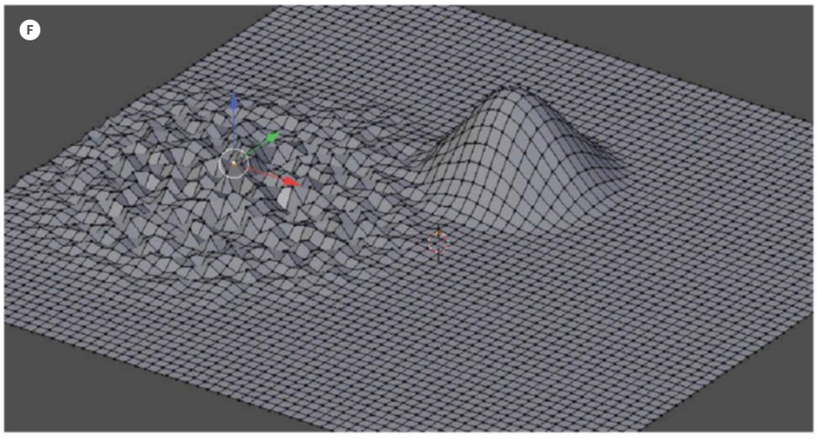
B Using a normal pass, we can relight our scene in full with compositing software

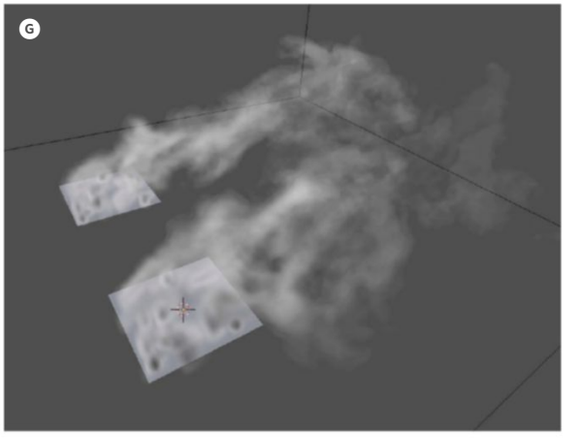


C The smoke for the short was created in Blender. It was rendered directly inside the software too









D The model that will be used in the animation

E Blender's curve and action editors make the animation much simpler

F Blender's proportional editing modes and ways to vary the geometry

G The smoke simulation can be viewed directly in the 3D window

H Depending on your GPU and scene, the rendering acceleration may be increased – even up to 30 times!

I An overview of all the rendering passes that were used in this project

From 3D application to compositing

01 Helicopter model

I created this model based on conceptual drawings from the director. The method I use in most modelling jobs is to create the very basic, 'sketch' model to match the proportions or scale and later subdivide its geometry by modifiers for adding more detailed elements. For material creation I've baked the Ambient Occlusion directly into the UV texture and saved it as a reference file for further editing in Photoshop **D**.

02 Adding the motion

To create the motion I've used Blender's action editor. It allows us to save all the object's animation key frames as an 'action sample' which can be later freely used in a sequence editor. By creating a set of samples for each movable element, I could control the aircraft much more easily than just by using a curves editor. The camera motion was created by tracking the target object created inside the aircraft **E**.

03 Creating the terrain

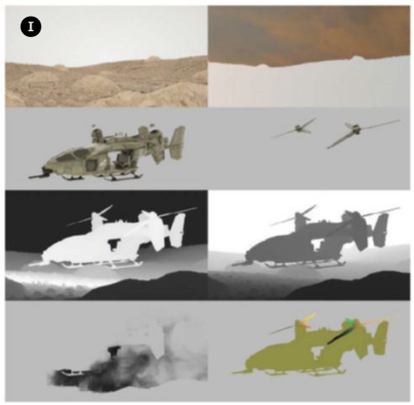
The terrain base was created from the subdivided plane object that was edited later on in Blender's 'proportional editing' mode. I've also used a 'displace modifier' to add some variations into the terrain and a 'smooth modifier' to soften the geometry a little bit. All the rocks are very basic, subdivided cube models distributed on the surface using two particle systems – one for the medium-sized rocks, and the second for very small ones. The stones were modelled independently and placed into the scene manually **F**.

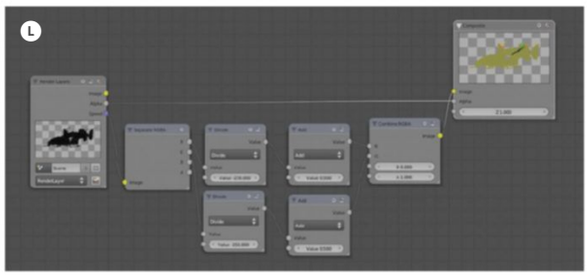
Always plan your work

When working on animation projects, a good managing skills are essential. Plan your work before you even start animating – a good roadmap will not only help you to determine each steps and time needed for their fulfilment, but will also prevent you from making a pointless decisions while working directly with your shots. It is also very important to name your files carefully – the more complicated is the animation, the more different files it has and without proper naming it's sometimes impossible to find things that we need at once.

04 Smoke simulations

I've created quite big domain objects and plane surfaces that were emitting the





smoke particles. It's important to set the rendering frame interval not only for the domain object, but also for the particle systems. Smoke simulations can be also diversified by using various kinds of 'force fields' such as wind or a vortex. This may increase the rendering time a little bit, but it will also improve the final look of the simulation G.

05 Rendering setup

Rendering each element separately gives me better control over the whole project later in the compositing application. Octane Render uses GPU technology for all the computation, so it took only about 40 seconds to render each aircraft frame in 720p resolution. I was exporting all the frames with an alpha channel applied to them. Terrain was also rendered independently on another PC so the whole animation rendering process took only a few hours, including render passes coming directly from Blender H.

J The very basic setup, ready for more intensive tuning

K Atmosphere and lighting tweaks applied to the pre-composited image

L The setup for exporting Blender's vector values to After Effects

M The Magic Bullet setup used for final colour grading

Optimise your scenes

Good scene optimisation within 3D software is essential when it comes to animation rendering. If you have estimated your camera movement, try to remove all the elements that are not visible as they might unnecessarily slow down the rendering process. It's also important to switch the global illumination off when it's not necessary, for example while creating the object masks or z or velocity passes. Unfortunately, some of the rendering processes cannot be speeded up, but might also be recreated within the compositing application.

06 Render passes

While preparing the material for compositing, it's usually difficult to predict all the render passes that might be necessary for finishing the project. The method I use is to save all scene-rendering setup into different files, so that I don't have to tweak everything just in case an additional mask or any other pass is required. This turns out to be very handy, especially if the renders are being held in several different applications I.

07 Compositing the material

Personally this is my favourite part. I usually begin with creating the environment and defining the image's saturation, general tint and exposure. Then I move to adding the other elements – in this case this would be our aircraft and foreground smoke simulations. By adding the diffuse and shadow passes, I gave the picture a more convincing look. I also had to mask the stones from the aircraft sliders in the first few seconds of the clip J.

08 Adding atmosphere and mood

I prepared two different z-passes directly in Blender. The first one was used by me to create an aerial perspective effect, adding some depth and a more natural look. I also used this pass to add a dusty wind effect by applying a solid colour layer with fractal noise effect and applying the atmosphere pass to it as a mask. The second z-pass, created for the lens depth-of-field effect, was also used to increase the shadows under the aircraft K.

09 Setting up motion blur

After pre-compositing all the layers, I used the ReelSmart Motion Blur Pro plug-in for creating the motion blur effect. To give the rotors a more realistic effect, I needed to create a special render pass that would include pixel movement information within itself. As most of the 3D applications use their own, built-in vector tracking systems, I had to use Blender's node editor and some mathematics to transform its vector values to the ones correctly interpreted by the After Effect's plug-in L.

10 Adding a final look

The last step, and probably the most eye-catching one, is adding the final colour grade and look. For this task I used the Magic Bullet Looks plug-in as it's very fast, user-friendly and has great features. After setting everything up, I rendered my animation as a PNG sequence and used VirtualDub for proper codec processing and saving the clip as a movie file M.

Custom content projected onto a scale model of the intended building

Get to grips with projection mapping

Projection mapping has exploded onto the scene in recent years, with high-profile brands such as BMW and Ralph Lauren investing in the technique. We look at the basics of how it can be achieved without spending thousands on expensive surveys

Projection mapping, in the sense of creating a projected image that is designed to fit its eventual surface, is certainly not a new concept – with its earliest roots attributed to artists such as Polish-born Krzysztof Wodiczko, who began using it as an artistic and political medium in 1980.

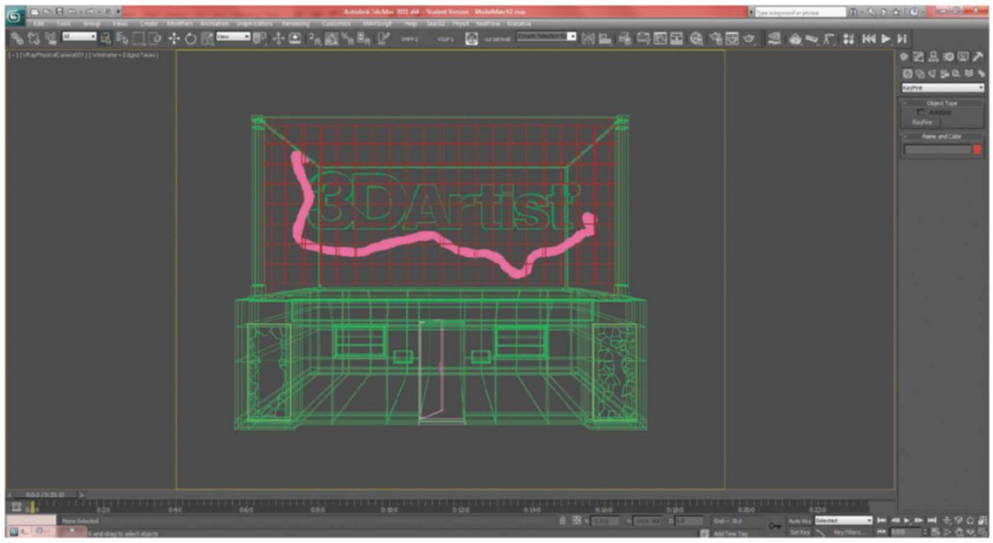
It is with the increased availability of digital projectors and specialist software that the original techniques have seen a high-tech, high-resolution revival and can be seen transforming the very fabric of architecture around the world.

The technique, even in its simplest form creates a powerful medium in which to interface with architecture and the built environment, essentially allowing the artist to modify a building's façade in any way that he/she sees fit. Unsurprisingly, this has proved a successful concept among graffiti artists and has sparked international (occasionally legal) light shows, with custom projector rigs allowing for a building to be 'drawn' on using laser pens. Software with which to achieve this is provided by the Graffiti Research Lab and is well worth checking out; those interested should head to www.graffitiresearchlab.com.

In recent years, many high-profile brands have seen the potential in such techniques and have acted as a catalyst in its advancement, with the likes of Ralph Lauren, Nokia, Samsung and BMW pioneering its use as an advertising tool. All of this major exposure has provoked many questions from artists and agencies as to how 3D projection mapping is achieved; there is no conclusive,

The best façades

Some façades lend themselves to projection mapping more than others. Large, plain surfaces are sometimes less effective as there are fewer features to interact with, whereas surfaces with too many features can distract from the show and create a cluttered feel. Try to find a surface that is neither bare nor cluttered for the first experiments; it will act as the best base from which to begin and should yield pleasing results.



We have constructed the initial grid using Photoshop on a laptop with the projector set to be a second monitor, subsequently maximising a file of the same resolution as the projected image with a black background. Begin to draw a couple of key horizontal/vertical lines and correct any distortion on the projector using keystone correction; this will then allow for a comprehensive grid to be drawn and blocked out matching the intended façade.

With the guides completed, the façade can then be blocked out and the resulting image exported to your preferred 2D/3D package for final modelling and editing. This is where the creative part takes hold and the options become almost limitless, from RayFire explosions and RealFlow waves to hidden rooms and façade transformations.

rock solid workflow that we are aware of as yet and many are keen to see its secrets kept on the basis of exclusivity. The method we will be discussing is undoubtedly not the fastest or most foolproof, yet it is consistent in delivering correct results at a very low budget, not requiring complex 3D scans of façades etc in order to function effectively.

Firstly, when considering a task such as this, it is important to understand the ultimate goal: will the content that is projected be 2D or 3D? 2D is slightly less complex and can yield fantastic results with the right motion graphics artist, whereas it is necessary to use 3D in order to create false lights/shadows, morphing elements, false perspectives and fluid/dynamics interactions. Both outcomes can be achieved using this Masterclass and the included steps should act as a solid foundation from which to start.

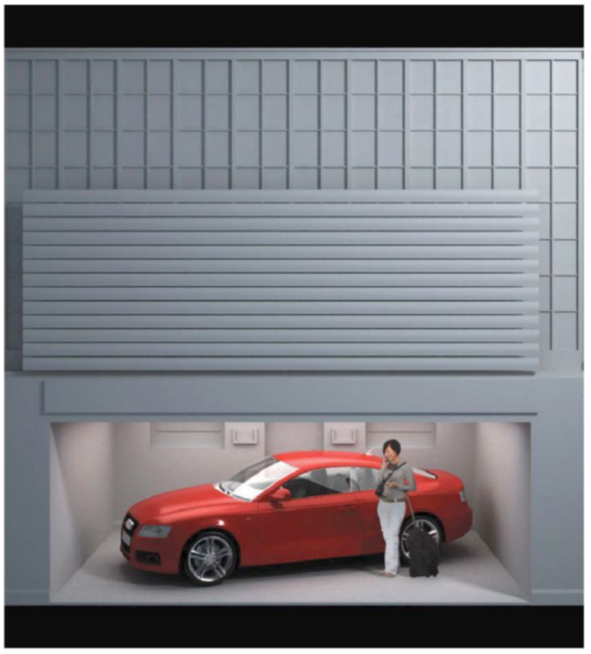
So as to create this guide we have used a scale model of the intended building; this is not a required step and it has been done so as to avoid any of the complications associated with permissions and electricity, etc, before the show itself. If you are in a fortunate situation where these restrictions do not apply, then the discussed method will work if applied straight onto the façade of the building with little hassle. We would recommend testing the technique indoors first – something as simple as a cardboard box with some windows drawn on will do the trick to start.

Site selection is key to a successful projection map and you must be conscious that some propositions can not be achieved before taking on a job. There should be a clear line of sight from the projector position(s) to the intended façade with no major interruptions such as trees etc. It is also worth noting that large façades/surfaces with little beam distance will require multiple projectors linked together to create one large (and very high-resolution) image. The chosen beam location must be accessible during both setup and show stages without moving in between; this means that the projector(s) can be set up to match your original grid and will maintain the correct perspectives. Should the projector have to move from the test setup, it will require a new grid to be created and the 3D content will require re-rendering – something to be avoided at all costs.

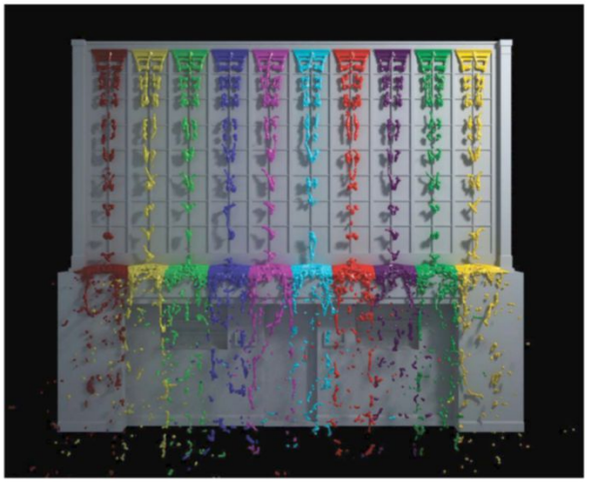
The projection equipment used is also important when projection mapping and should also be considered. There are several factors that you should take into account:
Type: LCD or 3xDLP. Single chip DLP projectors will work, yet will cause serious artefacts should you attempt to film or take pictures of the event.
Power: This depends on the ambient light conditions and distance required – 5,000 + ANSI lumens for small shows, up to 15,000 ANSI lumens for large projects.
Lens: May need non-standard lenses for especially long/short throw jobs.
Resolution: Higher the better, XGA (1,024 x 768) minimum ideally.

Many projector configurations are available, although many prefer Christie (www.christiedigital.co.uk) projectors for high-end jobs. These are very powerful and produce amazing results – however, they are not for those with low budgets and may be better as rented units.

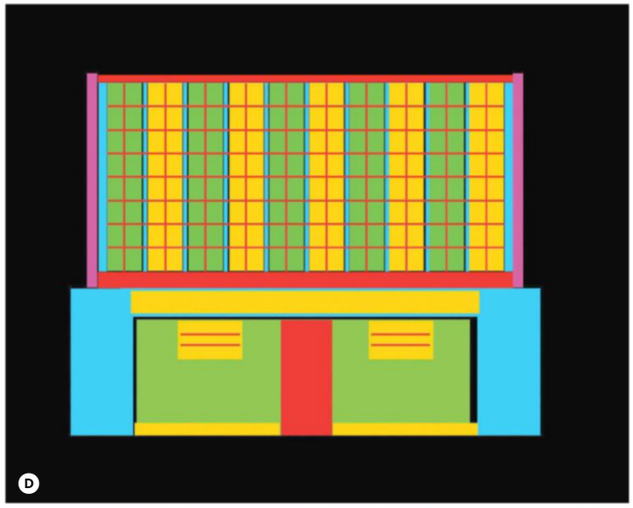
Once the projector and site are finalised, it is now time to set up an initial calibration grid as per the tutorial steps. This may not always be necessary and you may be fortunate enough to have a 3D survey of the surface; by calibrating this method however, it is possible to lock in a working configuration that should not deviate provided the projection site isn't moved. It also takes into account perspective and lens distortion.

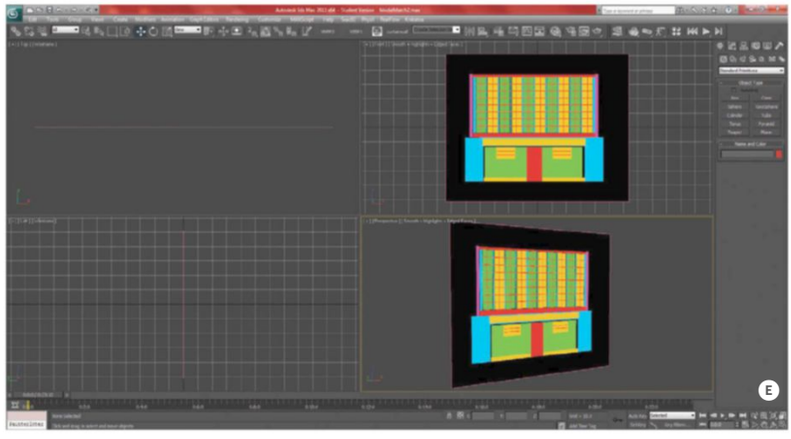


Creating false depth inside the model without compromising the initial edge



Using RealFlow to create fluid effects cascading from the building's roof





A The intended site, a small bandstand in Bournemouth Gardens

B An Epson EMP-7850 LCD projector – not the best, but fine for testing purposes

C Setting up an initial grid on the model so as to calibrate the projection

D The finished template from which to begin modelling the façade in 3D

E Template mapped to a plane in 3ds Max and centred

Get on with the project(ion)

01 The right site

Ensure that the intended site is free of obstructions such as trees and that the projector location is above audience head height. Also check whether the façade may require multiple projectors or any special treatment. Glazing will need to be covered so as to prevent reflections, although this can be achieved using something as simple as a paper/card covering A.

02 The projector

Position the projector in the best possible location; bear in mind that this should not change between testing and the final show for best results. Be sure to document this location thoroughly and mark its position on the surface. Using something movable or uneven can cause complications later (except from fixed-height platforms) B.

03 Initial grid

Power up the projector and set focus etc. With a computer connected, ensure the resolution is correct and set up a Photoshop document to the same value with a black background. Ensure this is at 100% and begin drawing in the key vertical and horizontal lines, correcting keystone distortion on the projector along the way. Once the key lines are working, begin to create a grid, marking out all of the features you wish to interact with C.

04 Blocking

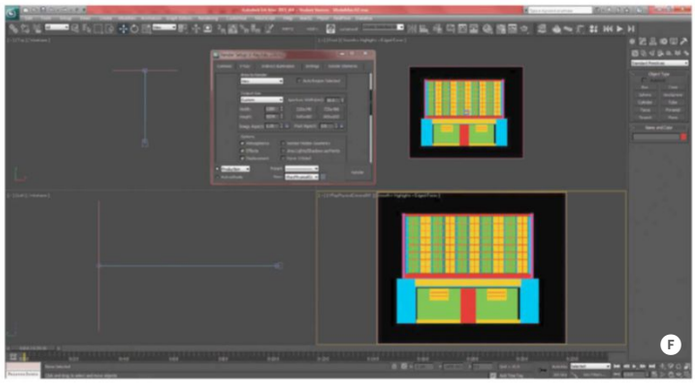
Now that the grid is created and matches the features you wish to interact with, it's now time to block out the appropriate areas with easily identifiable colours – this is relatively simple and providing your grid is correct, shouldn't take long. Once this is complete, it will undoubtedly require slight tidying within Photoshop – don't worry if everything isn't symmetrical, this is often a result of a slight perspective. Projection mapping certainly isn't a precise art and if it looks 'right' projected onto the façade/object, trust this over any discrepancies on screen D.

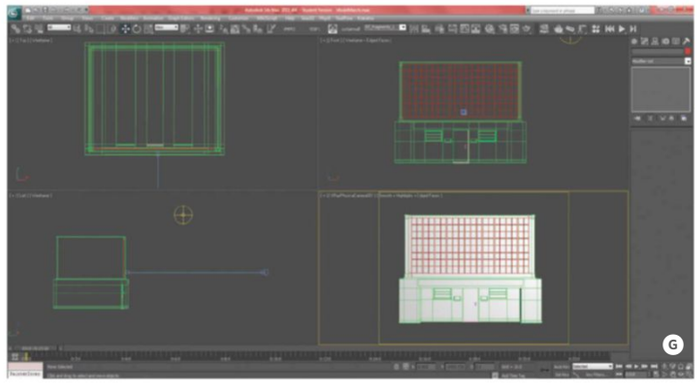
05 Export to 3ds Max

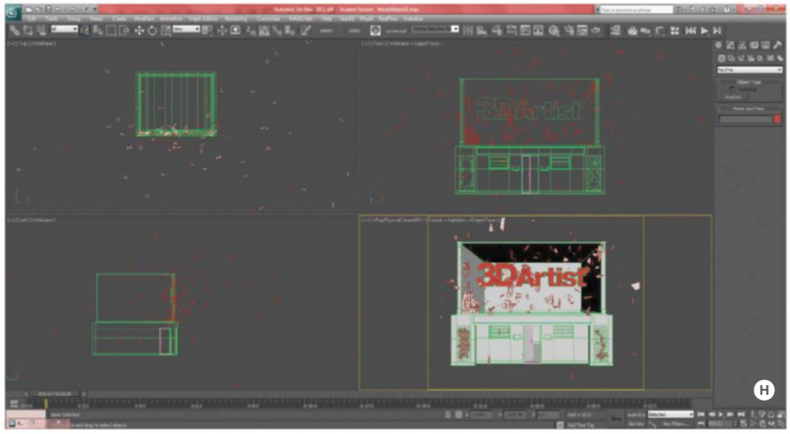
Once the blocking is complete, the projector is no longer necessary and it is safe to continue off site. Export this newly created image as a JPEG and map it to an appropriately sized plane in your chosen 3D program, positioning the plane at 0,0,0. For

Legal issues

Projection-mapping events should always be agreed with the owner of the building and reported to the local police/council prior to the event. Many light graffiti events are often shut down soon after commencing so it is important to ensure your plans are well thought out and not jeopardised by poor planning. Shows often draw a large crowd and this should also be considered; for instance, do roads or pathways need to be closed?







this tutorial we will be using 3ds Max although the technique should work fine within Maya etc too E.

06 Camera match

Set the render dimensions to match the plane and final projected image size. Create a targeted camera and position its origin to match that of the image plane, set safe frames in the camera view and pull the camera itself back so that the edges of the frame match the plane. Try to be as exact as possible at this stage; a slight mistake can come back to haunt you. If you have the luxury, we would recommend testing the render output by projecting onto the façade once again – it isn't essential however F.

07 Modelling

Lock the camera in position and note its co-ordinates. It is now time to begin modelling; this is achieved by working backwards from the image plane – depth can be estimated within reason, although too much variation will throw out the match to some degree. Once the model is complete, remove the initial plane and set an appropriate lighting rig – this will now form the basis for all 3D projection-mapped content. Again, render out and test should the opportunity exist G.

08 Interactions

Now the fun begins and you can now start to create elements for the final sequence. We have found that transformations, false perspectives, material effects and dynamics animations work particularly well. The simplest and perhaps most powerful way in which to start is to pull the window panes back into the building to reveal a hidden room/element. Be sure not to move the main model out of its calibrated position unintentionally H.

09 Render

Once content with your newly created animations, render out to an image sequence/video file and begin to edit further. If you created animations with objects going outside of the projected guide, we would recommend generating an alpha of the original render to cull any unneeded content – overspills don't add anything to the final show so are best dealt with beforehand. We usually deal with this in After Effects, subsequently blending the 3D with any 2D content to create the final sequence I.

10 Time to project!

Fingers crossed, all has gone to plan and the final sequence is created. This can now be rendered out to a video file and played back on a laptop. Now all that is left to do is reset the projector to its original position on site, ensure the file is playing at the correct resolution and calibrate the projector's zoom/focus once again. Voilà J!

F Render output size set, safe frames on and camera set in the correct position

G Completed 3D model of the building with some internal space already created

H A RayFire simulation which serves as one of the animation tests

I A frame of the final sequence ready to project onto the model

Model behaviour

A model is an excellent way in which to start; it provides a safe and dry testing environment that allows you to hone your skills before attempting a large-scale show. The model we have used is a laser-cut scale model of the intended site – although it can be something as simple as a cardboard box with windows drawn on. By using a model it allows for a consumer-grade projector to be used (such as the one utilised in this Masterclass) as less brightness and distance are required.

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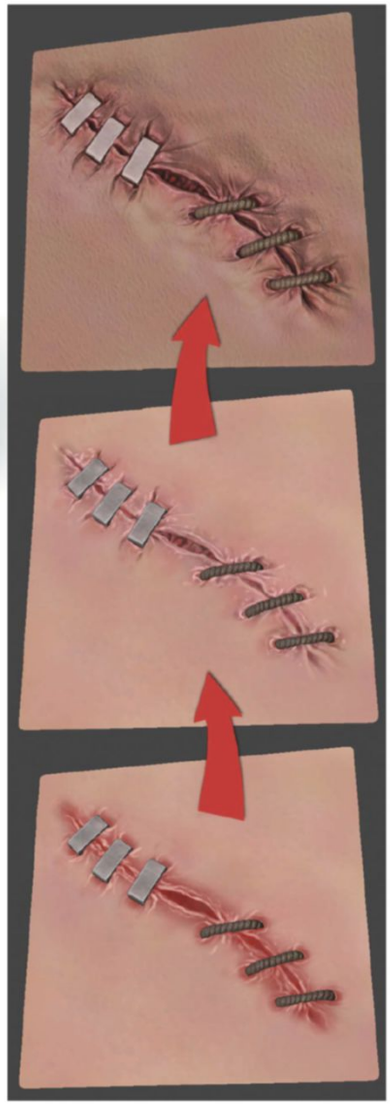

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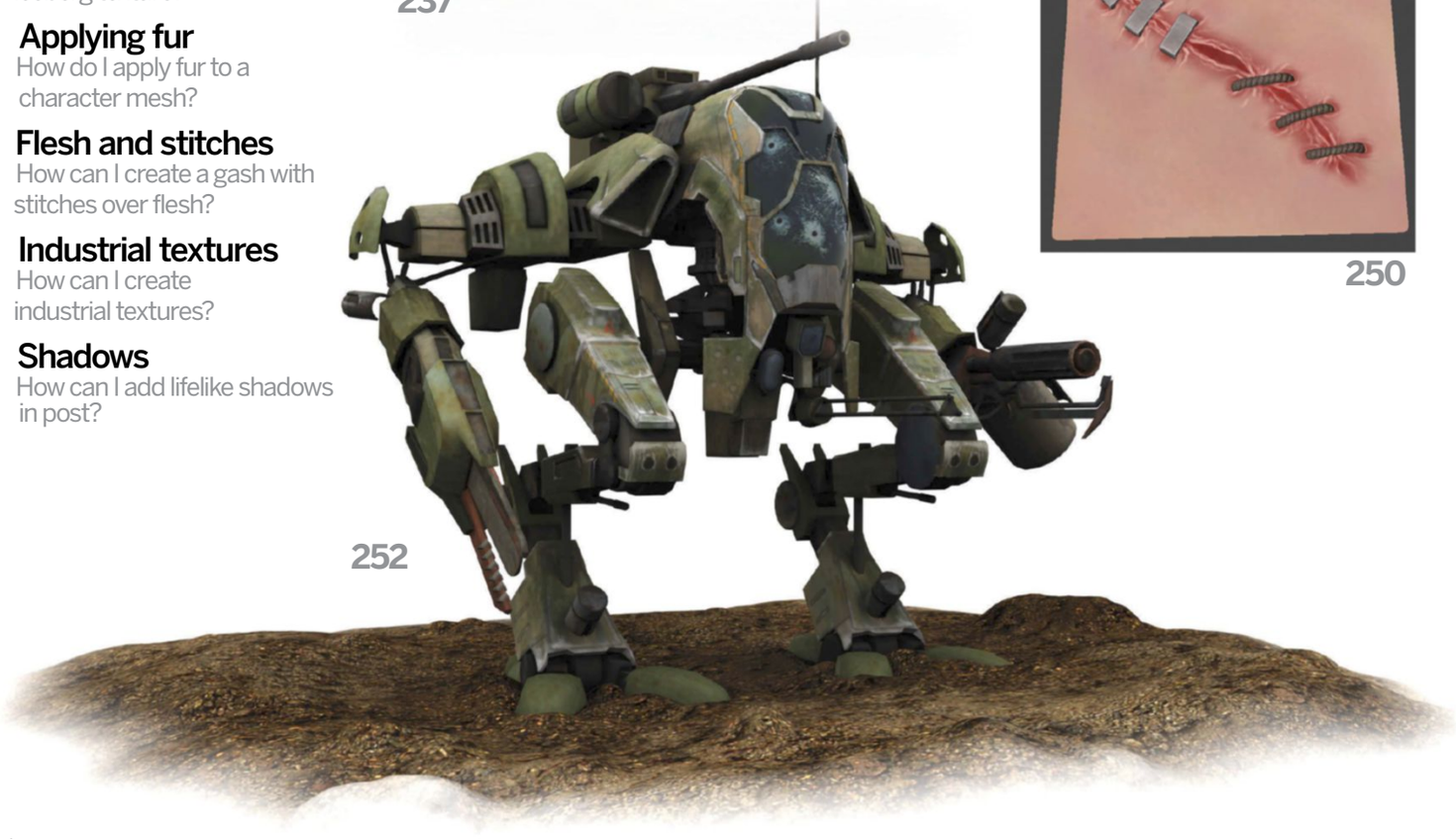

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How can I effectively set exterior light in arch-vis scenes

Cinema 4D

In this tutorial I am going to present effective ways of setting the lighting in renders of exterior arch-vis scenes. Most of the time I work in fryrender for CINEMA 4D, but I also use V-Ray. The techniques described here have their equivalents in most of the major rendering programs and, no matter which you use, these tips will help you gain a better understanding of daylight in your scenes.

To achieve the best effects you will need to set up the lighting in a particular way, work on the scene contrast with tone mapping and generate a render which will give you an opportunity to correct things according to your own vision during final postproduction. While lighting the 3D scene with the standard ambient light you will first have a chance to individually regulate the intensity of the two basic types of light: that generated by the sun (Sun light) and that of the dispersed daylight (Sky light). Both types of light influence the overall look of a scene.

The light from the sun should be set as parallel beams which have no falloff, while increasing the distance from the lit object. In reality, the sun – due to its great size and power – illuminates the planet with its parallel beams despite the Earth's spherical shape. In 3D programs – to avoid having to build a scene to a real-life scale – the creators of software like CINEMA 4D have provided us with a type of light that generates parallel beams for the entire scene. In this guide I'm not going to talk about the camera as none of the camera parameters – such as ISO, aperture or shutter speed – influence the colour or contrast of the scene's lighting. So, without further ado, let's begin our illuminating journey...

01 Getting started Add light with parallel beams to the scene or, as in fryrender, turn on the Environmental Lighting option and set Sun light in the panel on layer 1 of the LightMixer, leaving the default Sky light at layer 0. In V-Ray you tag the Sun light on Directional/Infinity light, which means you can regulate the sunlight and ambient daylight separately. Image A shows the scene illuminated by Sky and Sun, image B with Sky on and Sun off, and image C with Sun on and Sky off. This image set underlines the differences between Sun and Sky lights.

02 The right balance Sun light is very strong and influences the look and direction of shadows in a scene. Sky light, on the other hand, is complementary, encompassing the scene and gently permeating the illuminated shadows generated by a Sun light. By changing the ratio of the Sky light to Sun light intensity you can influence the contrast of the lighting in the entire scene. Image D shows the Sun light at 200% Intensity with Sky light at 50%; image E shows Sun light at 50% and Sky at 200%. In image A both lights are set to 100% Intensity.

03 Tone mapping basics Next up is setting the tone-mapping options of the rendering. The basic value to get your head around here is gamma. The most popular Gamma setting for rendering is between 1.6 and 3.0, depending on the needs of a project. The subject of gamma is complicated. To simplify it, let's just say that increasing gamma causes brightening of the dark areas of the image without interfering too much with the brightest parts.
The side effect is the reduction of contrast in the work, which can be corrected using the Brightness/Contrast options in fryrender, or with the Indirect Illumination and Color Mapping parameters in V-Ray. Images F and G present two fragments rendered with Gamma values set at 1.6 and 2.5, respectively, without any correction applied.

04 Differences in gamma settings

I intentionally presented the examples of tone mapping (images F and G) with a tree in shadow. Foliage can be one of the most complicated and tricky parts when it comes to lighting, but at the same time, if done well, it can be very effective visually. That's why it's advisable to make sure it looks perfect! Image H is a render with a Gamma value of 1.6, lightened up with the Brightness option and a tweak of the Contrast setting. Image I is a render with the Gamma at 2.5, decreased brightness and a much-boosted contrast. As you can see, the latter image has a significantly greater tonality in the shaded parts.

Final advice

The trick to great lighting is finding the right balance between light settings, tone-mapping options and camera settings. It is sometimes good to work on a render without a maximum contrast, any overexposure or very dark areas so it is easier to see the materials and tones during postproduction in your preferred 2D program. I recommend saving the renderings in the 16-bit mode, as this also gives you a lot more control when it comes to post. But, most of all, you should focus on how the light falls on the objects in the scene so, before using the rendering options, you need to apply the most suitable materials to the objects. I think it's fair to say that it's more integral to master the Material Editor than the rendering options if you want to achieve top-quality lighting. Find out for yourself – and don't forget to have some creative fun along the way!

05 Final scene composition After you have mastered the lighting settings it is time to focus on the details of the scene on which the light falls. In image J, I added a big tree with its leaves bathed in sunlight. On the right, beyond the camera, I placed a tall tree, which, by casting shade, adds depth to the foreground. At the same time, the shadow darkens the road to ensure your focus immediately goes to the brightly lit building, which is of course the main subject.

06 Light colours It is possible to set sun and sky colour for various times of the day. Making use of a Solar System in fryrender or the Sun/Sky options in V-Ray, you can count on automatic colour options to change the light, depending on the position of the sun above the horizon. If you prefer a hands-on approach, correct the effects by colouring the lights manually. In fryrender you can do this within the LightMixer, while in V-Ray you have to experiment with the settings in the Physical Sun tab. Image K shows how colouring the Sun and Sky lights affects the overall climate of the rendered scene in fryrender.

How can I perfect my paint jobs with V-Ray?

V-Ray

The VRayCarPaintMtl is a very effective solution compared to other custom car paint shaders, and allows users to quickly mock up convincing 'paint' with the option to include special touches, such as flakes and coloured coats. It is found exclusively alongside V-Ray 2.0 for Max and Maya; parameters should be largely identical but this guide will be Max-oriented.

This new material preset is inside 3ds Max's shader library under the standard V-Ray bank and presents several key parameters to kick off with – all of which are organised according to their appropriate category: base, flake and coat.

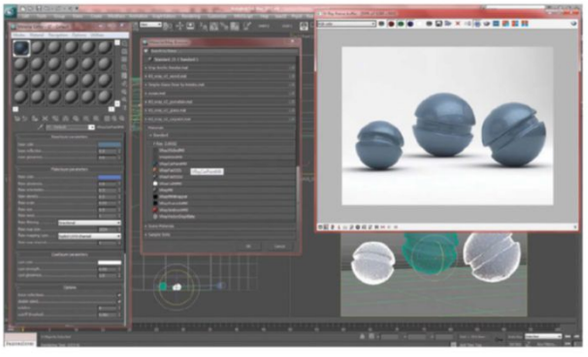
Once opened, the material will initiate a standard setup with a slight flake already in place; this can be cancelled by setting its Value and Scale to Black and 0, respectively. This is the case with the above Audi's material. We have also noticed that, once applied, the flake layer will usually need scaling down to around 0.001 in order to look right – though this depends on UVW mapping scales etc.

The coat layer also plays a key role in adding a finishing touch and this could perhaps be used to achieve the 'flip paint' look often seen on modified cars, for example. This can be modified using maps much like the rest of the material – something we'd seriously recommend trying if only as an experiment; it opens the doors to seemingly infinite material customisations and tweaks.

This workshop will explain some of the options contained within the material and how to yield good results. We will be using a standard teapot for the sake of testing and then moving on to applying our newly created material to the Audi model shown in the final image. While the CarPaintMtl may typecast itself in its name, its use can extend far beyond that of simply vehicles – it could prove equally useful in product design situations, for example.

01 Getting started

Create a simple test scene that includes some curved geometry in which to apply the material. We'd recommend using a basic studio light setup as opposed to an HDRI at this stage as it creates less reflection interference. Open the Material/Map Browser and navigate to the V-Ray Materials section; select VRayCarPaintMtl and it will open up in your Materials palette with default settings in place. Once this is applied to the geometry, you should have something like image A.



The range of options in the CarPaintMtl shader means that pimping your ride's paintwork has never been easier

C

02 Modify the material

As you can see from the results of step 1, the material isn't particularly attractive at first and the flakes look more like large chips. First start by changing the base colour; similar-coloured flakes tend to work best and are most like realistic metallic paint. On this basis we've opted to use a two-tone blue combination. Apply a UVW map modifier to your object so as to aid flake mapping and begin to tweak the flake settings. Illustrated are the results, but try out a few colour schemes B.

03 Get experimental

Now we have removed the flake altogether and upped the glossiness of the base coat by setting the Flake color to Black and reducing its Density to 0. In the image, we show a few more effects that can be created. The left sphere is a heavy blend between a red base coat and small yellow flakes; the central one uses a gradient base colour with yellow flakes; and the right sphere exhibits a purple coat layer, much like that found in pearlescent paint C.

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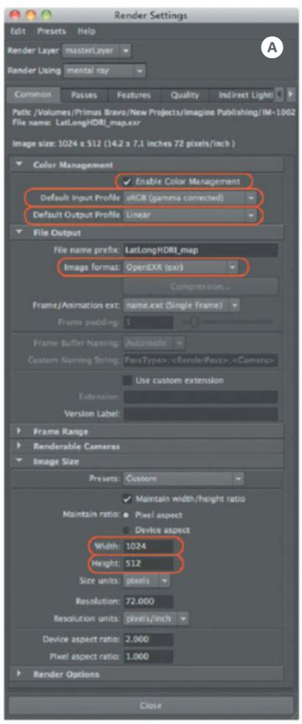
How do you turn a custom lighting rig into an HDR image for mapping to an IBL node?

Maya

Mapping an HDR image to an IBL node to provide the lighting for a Final Gather render is a pretty common lighting scenario in Maya. Typically, most 3D artists use HDR images that they've found on the internet, or maybe they've even created one or two from scratch. The problem is that, frequently, the HDR images that are available don't really meet the requirements for the scene. This is particularly true when trying to set up a studio-style lighting rig for a product visualisation shot.

So now we're going to create our own rig from scratch. First, I'll show you how to set up your own 'studio', complete with individually adjustable lights – including reflectors, such as umbrellas and direct illumination sources, such as soft boxes, using both Area lights and light-emitting cards.

To wrap up, I'll show you how to capture the light information in a high dynamic range LatLong image that can be mapped to an IBL node for a Final Gather render.

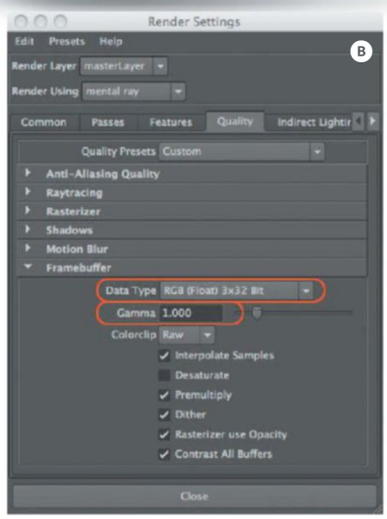


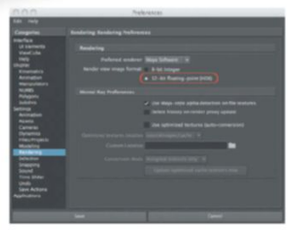
01 Setting up the scene for a Linear workflow

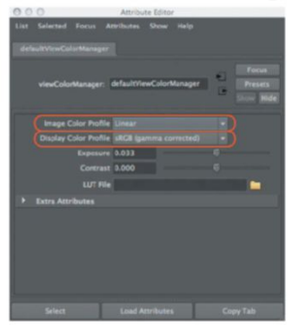
Before we start building the scene, we need to set up a Linear workflow, so that we can output an HDR image. Open the Render Settings and set Render Using to mental ray. Under the Common tab, check Enable Color Management and set the Default Input Profile to sRGB (gamma corrected), and the Default Output Profile to Linear. Make sure that under the Image Size tab, the Width value is twice the size of the Height, to get a correct LatLong aspect ratio A.

Now go to the Quality tab and open the Framebuffer section. Change the Data Type to RGB (Float) 3x32 Bit, and set the Gamma to 1.0. This will give us 32-bit HDRI renders. Use RGBA (Float) 4x32 Bit if you need to include an Alpha channel in your render B.

Open Preferences and go to the Settings>Rendering tab and set Render view image format to 32-bit floating-point (HDR) C. This will enable the Render View to display HDR images. In the Render View, under the Display menu, select Color Management, which will open in the Attribute Editor. Set the Image Color Profile to Linear and the Display Color Profile to sRGB (gamma corrected). By adjusting the Exposure and Contrast controls you can alter the way the render displays within the Render View D.

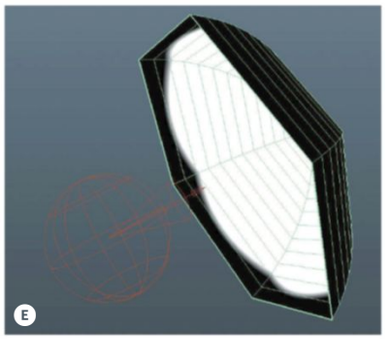






02 Lights/umbrellas

First, we need to build the lights. The first light we'll build is an umbrella-type reflector. The umbrella is made from a sphere with a subdivision axis of 6 and a subdivision height of 36, then delete the unwanted faces. You'll need to reverse the normals so that they're pointing inward, towards the Spot light. I applied a Lambert to the umbrella with the Diffuse set to 1.0. Next, I set up a Spot light on an axis facing the centre of the umbrella E. For the Spot light, I used a Cone Angle of 30 degrees and a Penumbra Angle of 30 degrees. Turn on Ray Trace Shadows and, under the mental ray>Area Light tab, enable the Area Light box and set the Type to Sphere. Turn up the High Samples to prevent noise in the shadows F. This creates a photometric light with realistic falloff. Make sure that Final Gather is turned on in the Render Settings under the mental ray>Indirect Lighting>Final Gather tab. Turning up the number of Secondary Diffuse Bounces to a value of 2 or 3 will mean the umbrella reflects light into the scene in a physically correct manner G. Here's a fisheye view of the scene, showing the umbrella lighting a 'seamless' background H.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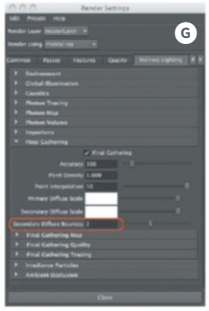
G

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03 Soft box

For the soft box, we're going to use a light-emitting card. The card itself is simply a polygon plane set to whatever size works for you. I applied a Surface shader to the card, and then mapped a Ramp shader to the Out Color.

For the Ramp shader, I used two colours with the Type set to Circular. The first colour is at the top, and is White with a value of 1.0; the second colour is about halfway down and also white, but with a value of 6.0 I. From Final Gather's point of view, over-driving the white value mapped to the Surface shader is the same as using an HDR image – it actually sees this as light. Using a Circular ramp with only a slight gradation (1.0-6.0) creates a more realistic-looking light. Image J shows the soft box illuminating the seamless.

I

J

K

L

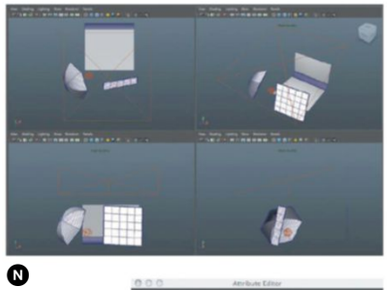
04 Flying overhead

For the overhead, we're going to use an Area light. Setting up the Area light is a little tricky. First, turn on Use Ray Trace Shadows. Then, under the mental ray>Area Light tab, enable Use Light Shape. Set the Type to Rectangle and turn up the High Samples to avoid noise in the shadows. Turn on Visible, so that it will show up in the render. Under the Custom Shaders, connect a Portal light to the Light Shader slot K.

For the Portal light, ensure that Shadows and Visible are both activated. Visible needs to be ticked under both the Area light and the Custom Environment settings or it will not be visible in the render L.

This setup creates a very accurate photometric light. The intensity of the light is controlled by the Intensity Multiplier of the Portal light, not the intensity of the Area light. Image M shows a fisheye view of the overhead and the seamless.

M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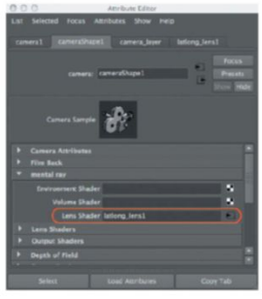
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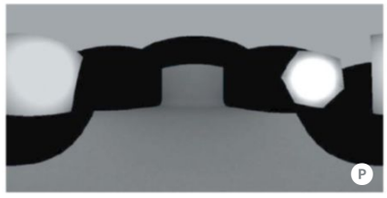
P

05 Set up the studio

Now we need to bring the lights together to create a studio setup. I've included a 'cyc' (a cyclorama) here, but you may wish not to use it here in the lighting rig, but in your product scene instead. Use any or all of the lights that we have created and set them up in whatever fashion is going to work best for you N. Do not use any Spot lights (other than the ones bounced off of umbrellas) as you will place those in your final product scene.

Now you can either combine this lighting setup with your product model and do a render of your product, or you can create a LatLong render in HDR that you will map to an IBL node in your product scene. To do that, you'll need a LatLong Lens shader. Just do a search on the internet for 'LatLong Lens shader Maya' and you'll quickly find several sources. These include instructions for installing them into Maya.

The LatLong Lens shader then gets plugged into the Lens Shader slot of your render camera, under the mental ray tab O.

Set the camera in the position on the cyc that your product will occupy. When you pull a render, the LatLong Lens shader will cover 360 degrees horizontally, and 180 degrees vertically P. In order to save an HDR render, you'll need to set File Output under the Common tab in Render Settings to OpenEXR (exr) or HDR (hdr) and then use a Batch Render. You can't save an HDR image from the Render View.

Setting up the product scene

All that's left is to create an IBL (image-based lighting) node (under the Indirect Lighting tab of the Render Settings) and map the HDR render of your lighting rig to it. You'll need to flip the image horizontally in Photoshop to get it to map correctly. For the product shot of the camera, I added a single low-intensity Spot light above and behind the product to cast a bit of extra illumination on the top of the viewfinder.

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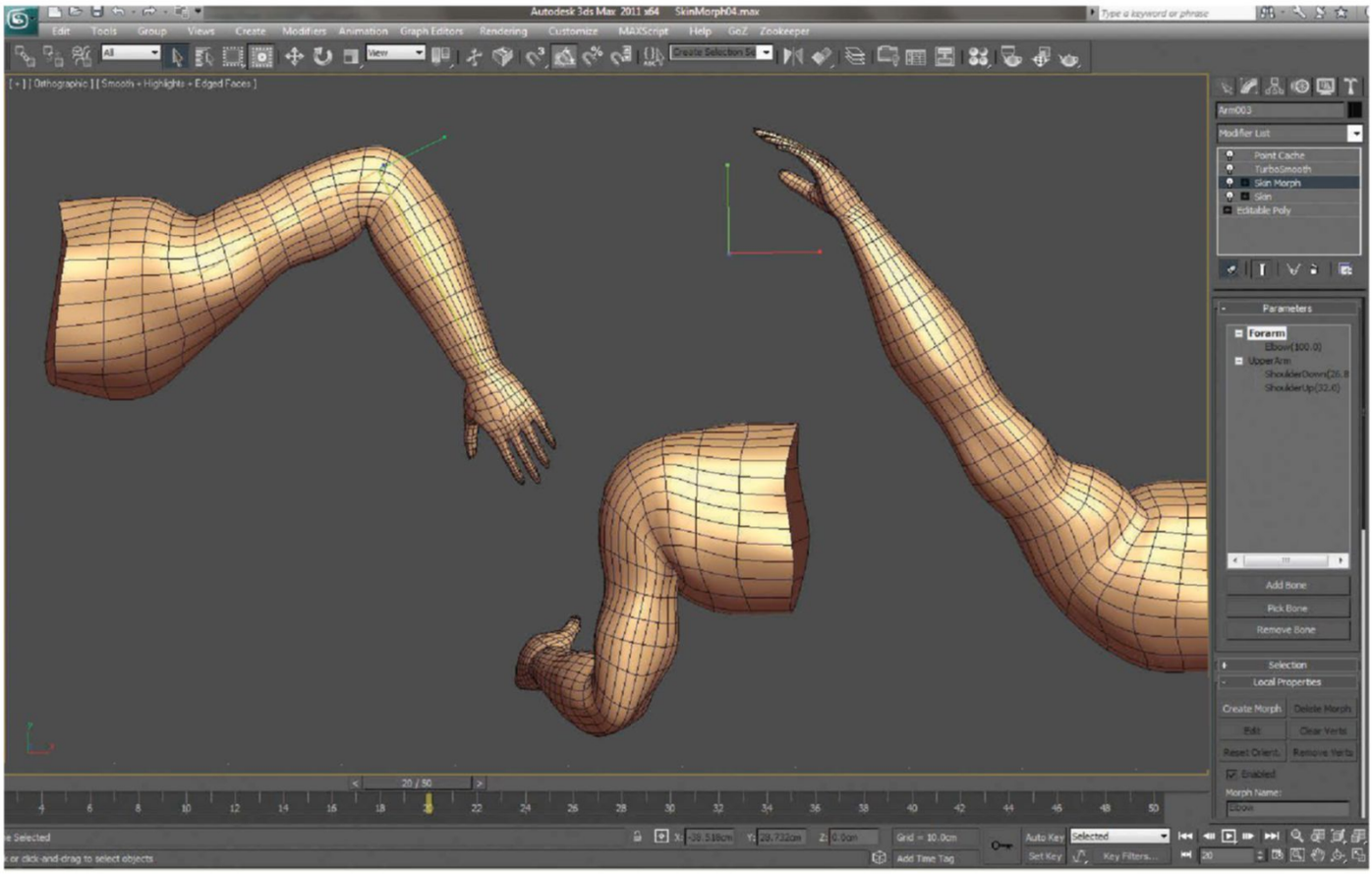


3ds Max

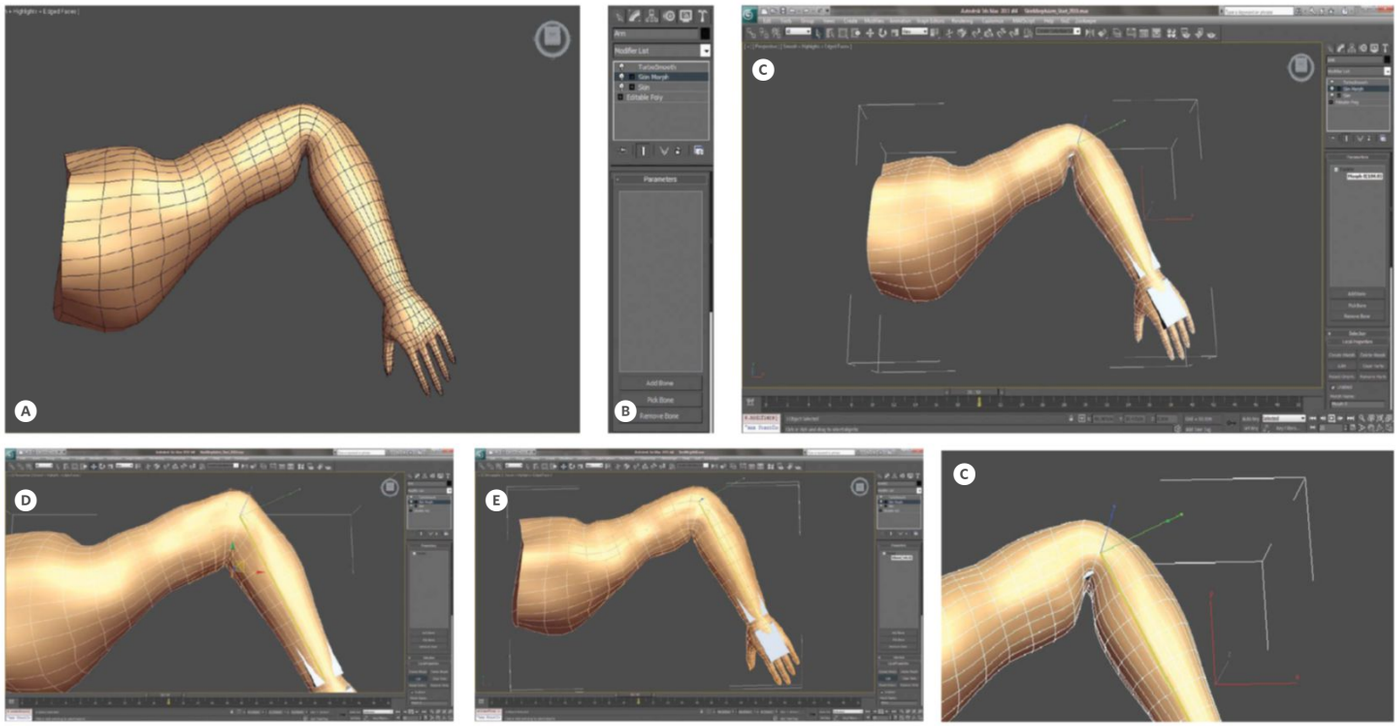
How can I get better skin deformation using 3ds Max?

Skinning a character can be frustrating for new and experienced character artists. Those new to 3D frequently experience rubber hose-shaped deformations at joints while the shoulders and pelvis can be challenging for even skilled artists. To avoid these common problems, I usually start by tuning envelopes to get solid basic deformation. The nice part about using envelopes is that they are a volume-based solution that allow for changes to the model even after the skinning process has started. It's good to begin with this method because you can work in an iterative manner to add geometry in places that might need more edge loops to deform without destroying your skinning.

Once you have gone as far as you can with envelopes, there may still be some problem areas. At this point, I recommend adjusting vertex weights and using the Weight tool to blend vertices that are misbehaving or to make sure a bone will have no effect on a particular set of vertices. Skinning fingers is a good example of this. If you have not splayed out your fingers far enough away from each other before skinning, it is likely that when you move one finger, the mesh for the adjacent finger will follow along. With vertex weighting, you can select all the vertices from the offending finger and make sure the bone next to it has zero influence on it.

Even after vertex weighting, there can be skinning issues and the need to improve or enhance the look of the deformation. There are options available in 3ds Max to accomplish this including Joint Angle deformers, Muscle systems and Skin Morph. Some will jump to these more technical solutions from the start and do all or most of their skinning using vertex weighting, muscles or morphing. This depends on your comfort level with the tools and environment.

Whether starting with Skin Morph or touching up some areas, it is a tool that offers a lot of flexibility. The basic premise is that it is applied after a Skin modifier and allows you to morph the mesh of your skinned character into position when certain angles are met by the bones. So, a Skin Morph could be used to create a bicep bulge as the angle of the forearm and upper arm bones approach 90 degrees. Once created, this morph target will be used any time the arm is in that position. This makes it easy to achieve natural muscle movements throughout an animation. While Skin Morph is great for muscle flexing and skin stretching, it can also be used very effectively to improve difficult deformation areas in the joints, shoulders and pelvis of characters.



01 Skin an arm

Open the 'SkinMorphArm_Start_2010.max' file on the CD. This contains a model of an arm including portions of the shoulder and chest. It has basic skinning and a simple animation to demonstrate some positions that can be difficult to skin. You can see the deformation at the elbow joint is poor. Also, looking at the back of the character as the arm moves to the side, the deformation between the arm and the back could use some work. Lastly, when the arm is raised in the air, the shoulder looks pretty ugly. Problem areas like this are very common A.

02 Assign a Skin Morph modifier

With the Arm object selected, go to the Modify panel and apply a Skin Morph modifier above the Skin modifier. In the Parameters rollout, there is an Add Bones option. Unlike the Skin modifier, you do not want to add all the bones that control the character here. You only want to add the bones that will control a particular morph. First, we will fix the elbow joint deformation and add a slight muscle bulge to the arm as it curls B.

03 Add bones

You usually want to pick the bone that is the child of the two bones that will create the angle. In this case, this is the Forearm bone. Click the Add Bone button and choose the Forearm bone object. Now that the Forearm bone is added to the list, we can create a morph target for it. Select Forearm in the list and go to Frame 20 in the timeline. In the Local Properties rollout, click the Create Morph button. This will generate a morph target for the selected bone at the angle represented at Frame 20 C.

04 Adjust the morph

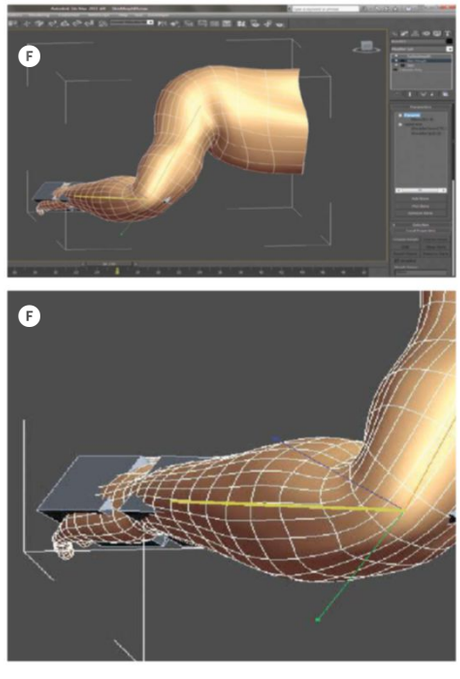
When Create Morph is clicked, many other options become available in the Local Properties dialog. Click the Edit button to go into Sub-Object mode and edit the morph target. Select a few vertices in the crease of the arm and move them out to achieve better deformation at the inside of the elbow joint. You can also turn on Soft Selection to get better results when modelling the shape of the arm D.

05 Add muscle bulge

Continue editing the morph target by pushing the elbow out a little and sliding some of the skin back over it. Next you can add a little muscle bulge to the bicep. Using Soft Selection, grab a few vertices in the centre of the bicep and drag them forward to produce a slight bulge in the arm. When you are happy with the result, click the Edit button again to leave editing mode. You can now scrub the timeline to see the morph happen. Change the Morph Name to Bicep so you are able to easily access it later E.

06 Morph the rest of the arm

Now that you have done one morph, you can continue to add another for the upper arm as well as the back and shoulder. Add the UpperArm bone and create a new morph for it at the down angle and another at the upper angle. Remember to name your morphs so you don't get confused later. Hopefully, Skin Morph will be a powerful addition to your skinning toolbox F.



Try the External Mesh option

Skin Morph has an External Mesh option that gives even more flexibility when it comes to creating morphs. We recommend using this on more complex meshes and skinning solutions. You can Snapshot a mesh and then create your morph target on that mesh. This gives you the flexibility to create your morph targets using any modelling tools such as the Graphite painting tools or Edit Poly relax operations. Once you have created your morph target on the external mesh, you can load it back into Skin Morph by clicking the None button and picking the external mesh.

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How can I add realistic grass to my renders in post?

Photoshop

Simple grass textures overlaid onto geometry very rarely look convincing when the camera is placed at eye level. Tiling becomes highly apparent, shadows can look razor-sharp and any triangulation of ground meshes becomes more noticeable in silhouette. However, there may be a variety of reasons why you've had to go down this route. Perhaps deadline pressures don't allow for processor-intensive features such as modelled or displaced grass, or maybe your renderer of choice doesn't even support any form of realistic grass simulation!

All is not lost, however, as spending a bit of time tweaking the render during the postprocessing stage can give you the flexibility of adding photographic details such as grass with a result that may be even more effective than a rendered version. The technique of using pieces of photos shown here will incorporate all of the natural variation and defects that a real area of grass would contain, but still take into account the lighting and form of your model. The technique can also be applied to other large areas of landscaping – paved shopping precincts, for example, or asphalt car parks.

In this example (one of five renders created for LSI Architects for a proposed student accommodation block at Harefield Academy), the scene was modelled in formZ from the architect's CAD drawings. It was then rendered with Maxwell Render, with the postproduction completed in Photoshop. The areas of grass were initially rendered with a simple grass texture applied. Although this won't fool anyone into thinking the area is natural grass, it gives us the rough colour base and some perspective detail that we'll need to start with.

Pile 'em high

I find it tends to make life much easier if each new Photoshop 'edit' takes place on a new layer, including any image adjustments. Similar layers can be grouped in folders. Separating out the edits like this allows for maximum flexibility if the design changes at a late stage and a re-render is required. It also helps workflow when using images from unbiased renderers – the postproduction can be started almost straight away, with the finished render being dropped in underneath at the last minute. The image here used 55 layers in all. A 'dusk' version of the scene was also rendered and this workflow enabled me to re-use most of my postwork, rather than starting from scratch.

01 Desaturate

The first job is to desaturate the areas of grass. As we'll be adding the grass colour manually later, we need to reduce the saturation on the base layer to avoid over-saturation. This can be applied using a simple Hue/Saturation adjustment layer above the render layer. A value of about -60 will do, leaving some original colour information intact. Use a layer mask to ensure that only the grass is affected A B.

02 Shade

Next we need to emphasise any rise or fall in the landscape to ensure the three-dimensionality of the grass area is apparent. On a new layer above, carefully brush over the grass area using a soft brush on about 10% Opacity white or black, to add in highlights and shadows. It doesn't matter if it doesn't look entirely realistic at this stage – the shade areas need to be exaggerated to be noticeable later C.

03 Source image

Now we need to find some photos of grass that fit the scene. There are several things to bear in mind – firstly the type of grass you're trying to represent. A rough field? A well-kept tennis court? Secondly, the lighting. The time of day and lighting conditions will need to be similar to ensure the shadows fit the scene. Finally, the perspective, angle and scale of the image needs to be close to your render. The best bet is to go out and take some shots yourself, but you could also find some online D.

04 Overlay

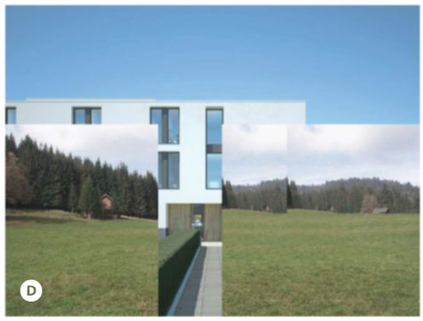
Paste your grass photo over the area, making sure the perspective and scale of the blades of grass fit the scene. If the image doesn't fit, don't worry – you can easily use more than one copy of the image, or a different photo, and patch them together to cover the area. Trim your photo to the edge of the grass area using the same layer mask as you used in Step 1. Change the blending mode to Overlay and then play around with the opacity until it starts to look right E.

05 Rough it up

Next we need to roughen the edges so that the area looks like natural 3D grass. You can use the standard Photoshop grass brush, but I find the spatter brushes tend to work quite well for this job. On a new layer, select the Clone Stamp tool and set the Opacity to around 50%. Reduce the size of the brush if necessary until it matches the size of a few blades of grass and work your way along the edges of the grass area, using small, quick, upward brushstrokes to 'rough up' the edge. Keep the brush size appropriate to the scale of the grass F.

06 Details, details

The final stage is to pay attention to any shadows falling on the grass area. These may be from rendered elements or, like the trees in this example, from 2D elements added afterwards. Create any shadows needed on a new layer – in this example I've used a dark grey-blue multiplied over the image at 50% Opacity. Again, use the grass or spatter brushes to roughen the shadow edges to make the shadows fall naturally upon the grass G.



> "...we need to emphasise any rise or fall in the landscape to ensure the three-dimensionality of the grass area"

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ZBrush

How do I texture with SpotLight?

SpotLight is one of the groundbreaking new features in ZBrush 4. In brief it is a texturing tool, but in reality it is far more than this, offering the ability to manipulate and combine images before you project them onto your models. Thanks to SpotLight you can texture in a fast and intuitive manner without the need to use any extra 2D applications to prepare your images. It is also very handy for sculpting details on model surfaces.

In this tutorial I am going to show you how to utilise all that functionality to create a detailed, believable raw meat surface. I will show you: how to load and organise your images, as well as how to prepare them for texturing without using any external programs, but instead by performing adjustments on them within the SpotLight tool.

I'll also consider how to manipulate them during the painting process to gain the most from your photographs, the painting process itself and tips on how to use SpotLight to sculpt details onto a SubTool with details matching a painted surface.

SpotLight's interface is simple and has a nice contemporary look. It consists of a round widget – with a selector around the outer part allowing you to choose the various functions. This is also used as a manipulator and a pivot for all your transformations.

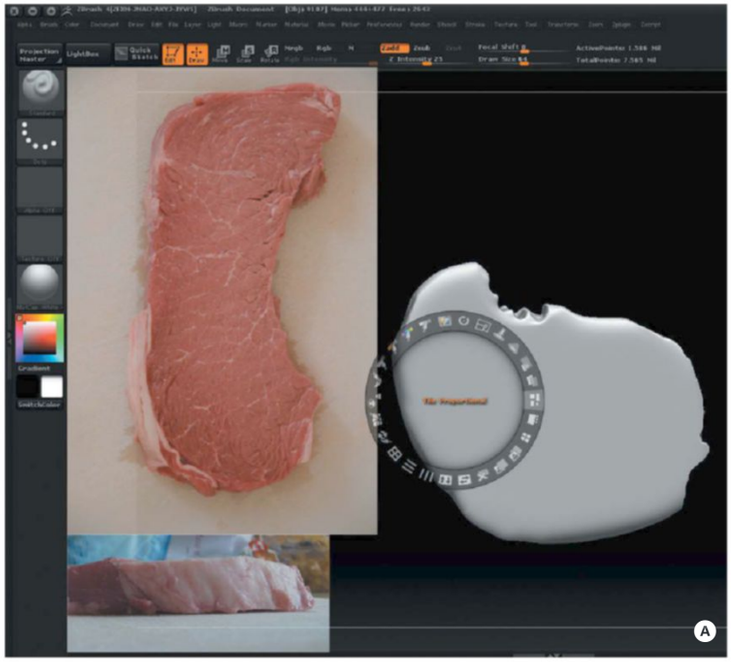
Depending on the chosen function you can modify your images by pressing widget icons and clicking and dragging the icons in both clockwise and anticlockwise directions. By adjusting the RGB Intensity or Z Intensity sliders, or by holding the Cmd/Ctrl or Shift keys while performing it, you have even more control over the process. So once you get used to its workflow, it's a great timesaver.

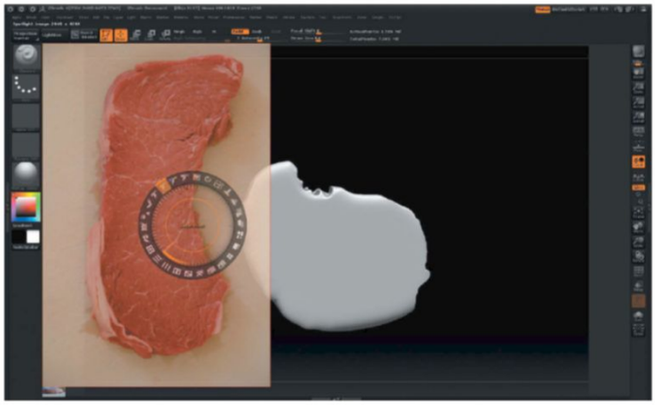
To start, other than textures, we need a model. I created mine using the ShadowBox tool, which is also new to ZBrush 4.

Keep in mind that painting with the Light Box – just like regular PolyPainting in ZBrush – is dependent on the mesh density of your model and so it must be sufficiently subdivided. To get enough details from your surface for a 4,096 x 4,096 texture, your model needs to have about 10 million polygons; for 2,048 x 2,048, it should have about 4 million polygons; and for 1,024 x 1,024 around 1 million.

Keep your SpotLights organised

You can save your SpotLight for future use. I highly recommend doing so by clicking the SpotLight directory inside the Light Box. This way you can have fast, easy access to your best and most useful images on new projects. Save your texture sets for various specific tasks such as texturing painted, damaged or organic surfaces. Save and Load SpotLight options can be found in the Texture palette. You can also access your saved files via the Light Box.





> Switch the Paint mode on and off to make image changes

01 Load and handle textures

To start working with SpotLight, we need to first load a texture. To do this use Texture>Import and then, with a texture selected, click the Add To SpotLight button. SpotLight starts automatically and the widget appears together with your texture on the screen. Repeat the process to import all needed textures. There are a few different options like Tile Proportional, Tile Selected and Tile Unified to organise them on the screen A.

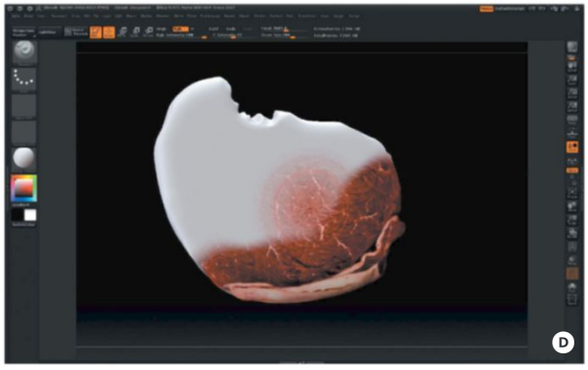
02 Adjust textures

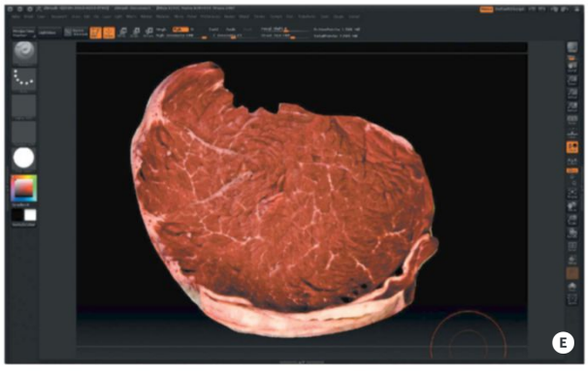
As we want our steak to look fresh and juicy we need to adjust the contrast and saturation of our images. To do this, rotate the SpotLight widget with the Saturation and Contrast buttons active. If you're not happy with the result, use the Restore option to undo any changes and start again.

Double-click a thumbnail of the second texture to activate it and repeat the process. The colouring of this texture differs slightly from the previous one so use the Hue setting to correct it B.

03 Manipulate textures

Now it is time to adapt the textures to match the size and shape of the object. Do this by using the Rotate and Scale functions. To help the process, you can also adjust the opacity of the image. Remember that all the transformations are based on the centre of the widget. You can move it by clicking and dragging inside the central orange circle. To move the whole texture, click and drag inside the SpotLight widget C.





04 Texture painting

It is now time to paint our texture on the model's surface. Press the 'Z' key to enter Paint mode. The texture disappears and instead there is a round preview of the image beside our brush indicator. The size of this revealed area can be changed with the SpotLight Radius option. Adjust RGB Intensity and Draw Size of the brush and start painting. Switch back and forth by using the 'Z' key when you need to change the size or rotation of the source image D.

05 Push pixels

Hopefully varying areas of painted texture are blending well so keep going by adding in more details. Remember to switch the Paint mode on and off to make image changes. For a better fit to the curvature of the model, adjust the border of the photographed steak to fit the shape that you want. You will be able to achieve this with the Nudge option. You can activate other images and follow this process to build up detail E.

06 Sculpting

You can sculpt details too using your image inside SpotLight. It is a very straightforward process; all you need to do is activate the Zadd option of your brush. For a better preview of the changes, switch RGB off. Although this is one possible method, I prefer a different approach: when your painted texture is ready, switch the SpotLight off by pressing Shift+Z. In the Masking menu choose Mask By Intensity and switch PolyPaint>Colorize off. Now you can add details to the surface with the Clay and/or Standard brushes F.

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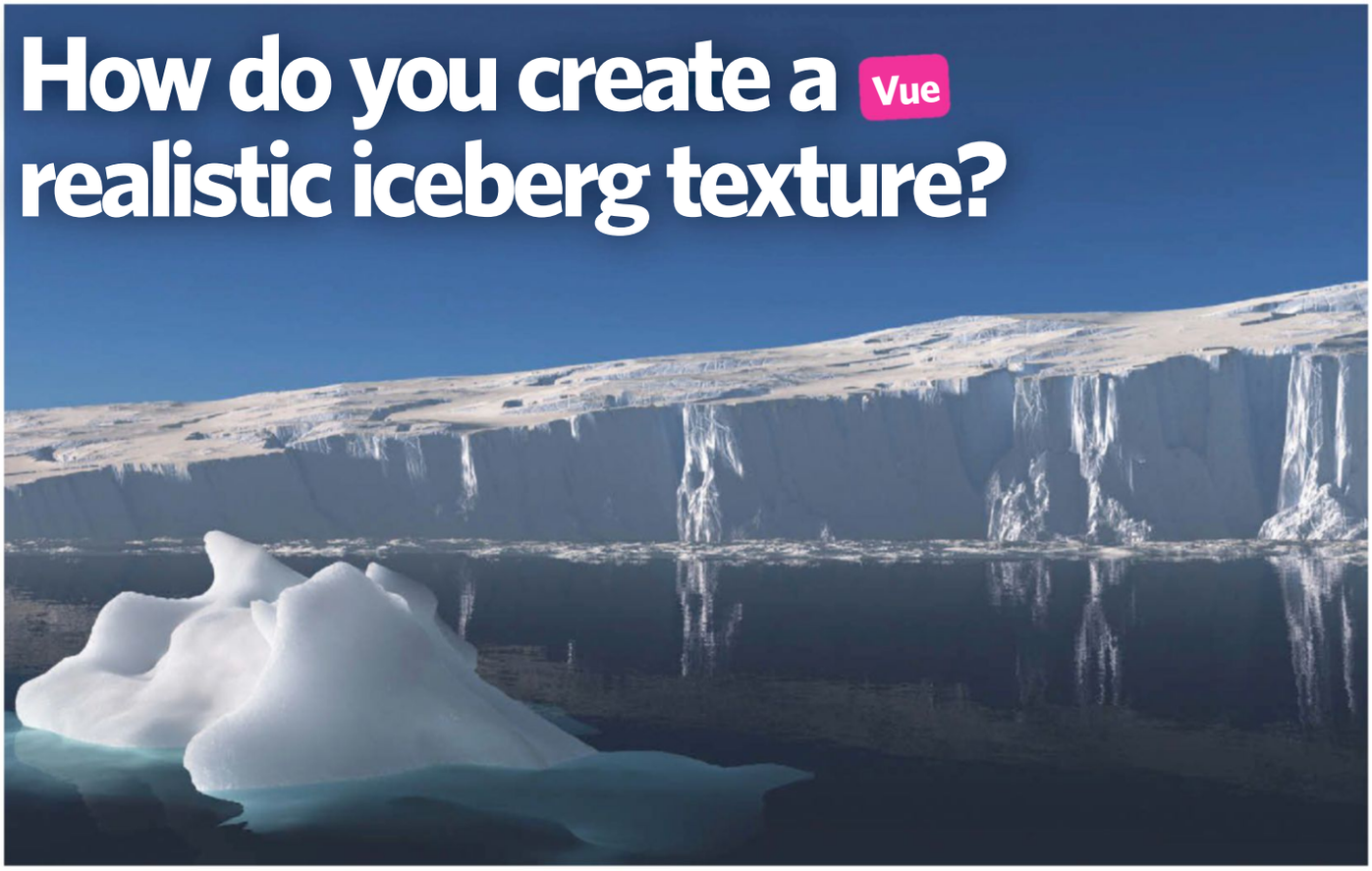
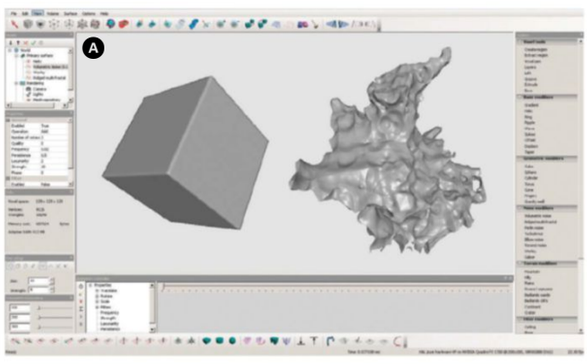
How do you create a realistic iceberg texture? Vue



In this Q&A, we explore the various aspects of creating and texturing icebergs and ice fields. For modelling close-range icebergs, we'll use a procedural voxel program called Acropora. To texture the model we'll use Vue's Translucency toolset in the Material Editor – more commonly known as subsurface scattering – in addition to colour, bump and highlight options. For long-range ice fields, we'll utilise GeoControl2 for the modelling and another approach to translucency for the texturing as the SSS effects don't seem to bring huge benefits, only very lengthy render times in this case.

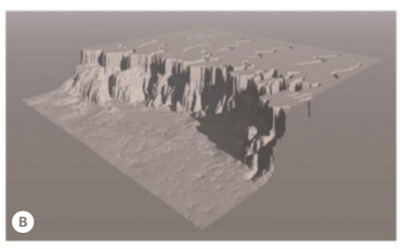


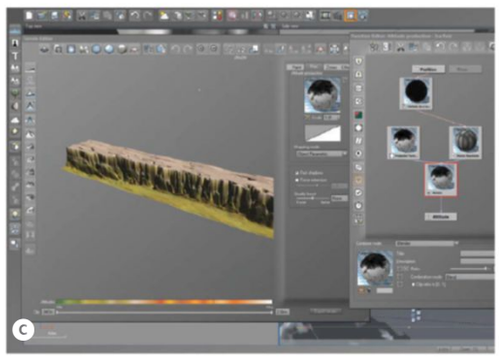
01 Close-range icebergs

The close-range iceberg has been modelled in Acropora. It's a procedural voxel-modelling program that's easy to use and has a lot of potential. It can create organics, terrains, caves, rocks and many other textures. This particular shape was obtained from a single cube, onto which various procedural functions were applied to get the desired effect. In order to get as much detail as possible, the voxel density was increased to 512 x 512 to generate a high-poly object (over 2 million). However, when Vue imports the object, it's somewhat smoothened and many of the smaller details are lost A.

02 Long-range ice fields

For the long-range ice, I decided to use

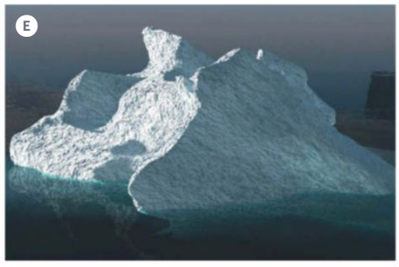


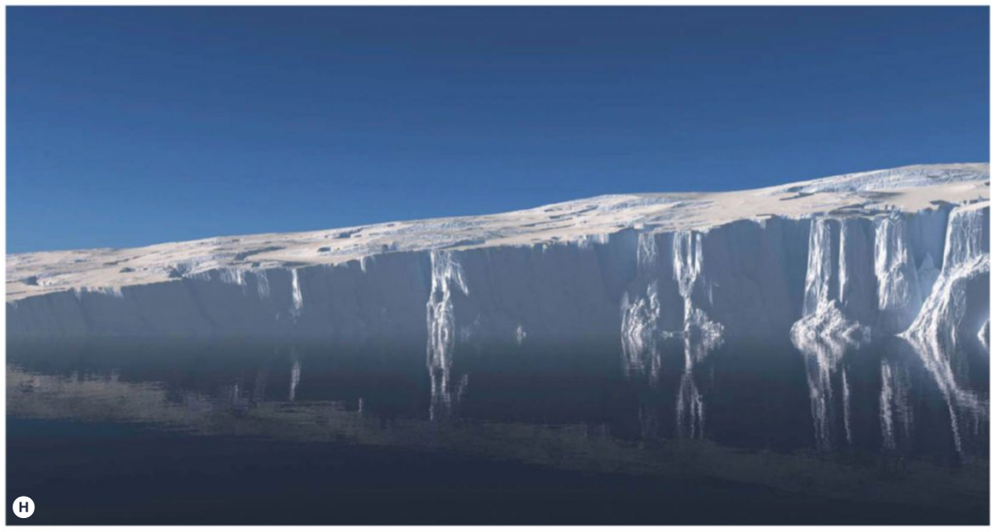


GeoControl2 as my modelling tool. In this particular case, it gave me better control over what I wanted to achieve. The 16-bit TIFF (4,096 x 4,096) generated from GeoControl2 is then imported into Vue via a procedural terrain. To add some variation to the overall shape of the ice field, the picture was blended with a very small amount of the Rocky Mountain algorithm. The terrain was finally stretched to get the desired aspect ratio B C.

03 Texture the close-up iceberg

Next we are going to look at the material

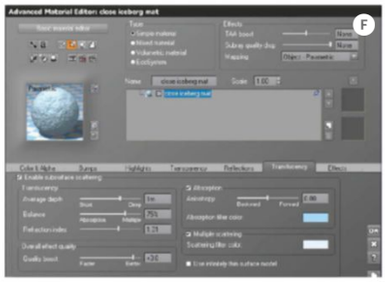


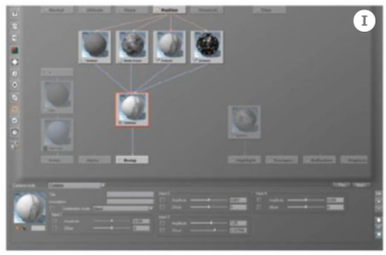


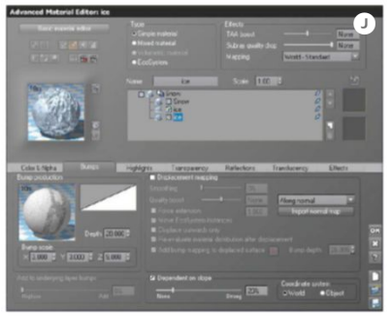
of the close-range iceberg in greater depth. First we will adjust the Color map. Instead of using pure white for the material we will be using a slightly turquoise-tinted map. As mentioned before, for some reason Vue smoothened the imported object to the extent that small details are lost. This is why we will add a Bump map to compensate for this undesired side effect. Displacement could also be added but this dramatically increases render times. As you can see in the screenshot the iceberg still isn't very realistic. This is the stage where Vue's Translucency feature will bring the berg to life D E.

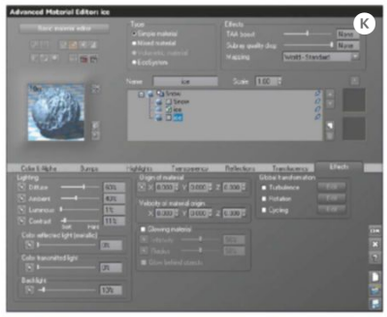
04 Texture the close-up iceberg 2

The first thing I did was to set the Refraction index to 1.309. The Average depth to which the light will penetrate is set to 1m; this might seem a lot, but it's linked to the object's size and distance to the camera, in this example. I then enabled the









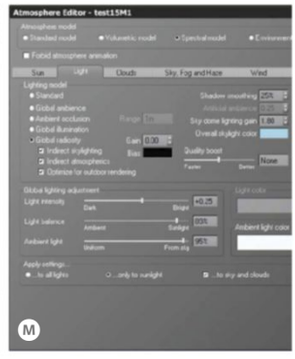
Multiple scattering box. The Balance parameter under Translucency is increased to 75%. Next the Absorption filter color is set to light blue and this will define the translucent colour as the light travels through the object. The Multiple color (diffuse) is set to a very soft blue to give an overall bluish tint to the iceberg. The last step is to push the Quality boost to at least 3 in order to reduce noise (it does increase the sample taken to calculate the SSS) and get more realistic SSS behaviour. To complete the material, some highlights are also manually added to account for the shininess of the ice in the sunlight F G.

05 Texture the long-range ice field

For far-away ice the use of subsurface scattering is not really a necessity. In my view, it does not bring any real benefit – but it does significantly increase render times. Here the material is made of a base blue ice-like material and a top snow layer covering the ice. The ice material uses a pale blue Color map and has a Bump map made up of a combination of different functions. Because the distance between the ice field and the camera is quite sizable, the Depth of the bump is set at 28. In the Effects tab, the Backlight is set to 10% and the Luminous level to 1%; this gives a slight glowing effect. The top layer is a completely white powdery material to simulate freshly fallen snow H I J K.

06 Lighting/rendering

In this scene, I have used the Spectral atmosphere model in combination with GI. In order to replicate what could be an arctic blue environment, a dark blue shade was used for the sky and the Light intensity was increased to +0.25. The Sky dome lighting gain was also pushed to +1.8 to create some appealing indirect lighting on the front of the iceberg and the distant ice field L M.



Translucency tips

Vue's Translucency function does not seem to be used very often, which is a pity as it's powerful and relatively easy to use in comparison to the Function or Material Editors that can sometimes be overwhelming. Having said that, some trial and error is necessary in order to get the best results. The main drawback I currently find is, in order to get a realistic finish, it comes at a price – namely, a high render time!

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Teodoru Badiu

3DArtistonline

Personal portfolio site
www.theodoru.com

Country Austria

Software used
modo, Photoshop

Expertise Teodoru specialises in modelling, texturing and rendering 3D illustrations

Tips

When using the Comb tool you have the option to check Tip Edit mode to affect the tip of the fur or to edit the full guides. It's also helpful to change the brush size to suit your needs; using a big brush for the body, for instance, and a smaller one for the face. Be aware that after rendering you may need to add an AO pass and do some small adjustments in Photoshop to make the final image pop.

Software used in this piece

modo Photoshop

Source files available

Custom fur settings

How do I apply fur to a character mesh?

For this tutorial you'll need a basic knowledge of using modo. You will also require your own model as I will be applying these steps to one I'd already made, which is not supplied with your source files.

There are different ways to control fur in modo. In this tutorial, we'll be looking at how to use a Fur Vector map with the Comb tool in order to create our own Fur Length map in Photoshop. Of course there is also the possibility to add a Fur Length map via the Hair tool menu and to use this to control follicle size, but I prefer the precision offered by creating the map in Photoshop.

This method needs a proper UV unwrapped character with the UVs exported and also with a Diffuse Color map that will be used to make a colour map for the fur. I will also use two frame passes for the rendering to get a smoother look in the fur, though the downside of this is that the rendering time will be doubled. This might not sound so bad, but if you're on a tight deadline, you have to consider where your priorities lie in terms of quality.

For example, the main image rendered for this workshop is 3,000 x 3,550px. For one frame pass it took 12 hours, while for two frame passes it took 26 hours to render.

01 Creating the mesh for the fur

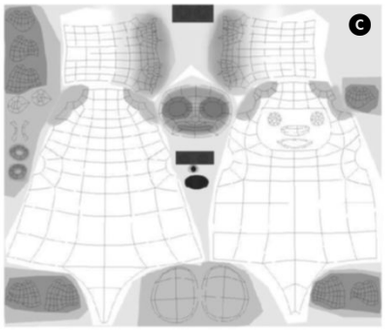
Open the file containing your character. In Polygon mode select all the body polygons of the character and then copy and paste them onto a new mesh; this will be used as a base for the fur. To avoid problems with the fur inside the mouth, eyes and soles of the feet, etc, delete those polygons. Rename the new mesh 'Fur' and apply a new material, also named 'Fur' A.

02 Fur Material settings

In the Shader Tree select the newly created Fur material and go to Add Layer>Special>Fur Material. Set the Fur Material Spacing, Length, Width, Taper and Max Segments according to the needs of your character, then go to the Fur Shape and Fur Kink tabs and set all of the parameters to 0. Add colour to the Fur material or copy the Diffuse Color texture of your character above the Fur material B.

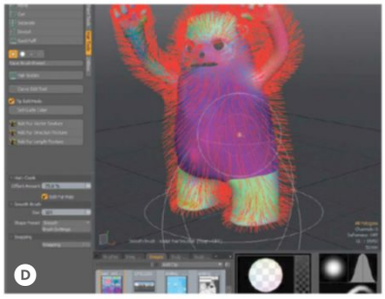
03 Fur Length map

For better control I decide to make a Fur Length map – I use the UV texture of the character to do this. In Photoshop, open the UV map and create a new pure grey file at the same size as your Diffuse Color texture. In this case, I want shorter fur on the face, hands and feet. To achieve this, I have to paint with white for long fur and with dark grey/black for short fur then add the new file as an image map and set the Effect to Fur Length C



04 Fur Vector map

Change to the Hair Tools mode and, with Fur mesh selected, click on Add Fur Vector Texture to create a 512 x 512px map. Pick the Comb tool and, with a Smooth brush and the Edit Fur Map option checked, start work on the face and body of the character. You can also use the other Hair tools if you think you need them; it depends on the final look that you're going for. Don't forget to click on the image and Ctrl/right-click to save any changes to the map D.



05 Fur Material settings 2

Back in the Fur Material menu, check View Frustum Culling and Remove Base Surface. Select the Fur Shape tab and start to adjust the settings from top to bottom. Keep making small changes and watch how your tweaks affect the guides in the preview window. For my character I want a lot of stray fur, as well as an overall fuzzy look. When you're done with all the settings for Guides, Jitter, Bend, Kink and Fizz, switch to Preview Render to see the result E.

06 Prepare for rendering

Prior to rendering I adjust the Material Ref Specular setting, as well as the Fresnel, Roughness and Reflection values. I also add a small amount of subsurface scattering to the Fur material. Change the frame size to taste, flick on the GI and add an Ambient Occlusion output and then, via Render in the Shader Tree, select the Channel tab and scroll to the end of the list and change the Frame Passes to 2. This gives smoother fur but also doubles the render time. This choice depends on the quality you require and any time restrictions you might have F.

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How can I create a gash with stitches over flesh – like Frankenstein's monster?

ZBrush

One of the most classic – and practical – monster features is the grotesque stitching that holds huge wounds shut and totally unrelated body parts together. From Frankenstein's monster to the Reavers in *Firefly* and *Serenity*, they tell everyone that this creature is way too scary to wait for his injuries to heal. Whether it's done with thread, rope or giant metal staples, a monster is only as frightening as the horrific wounds it's ignoring while it hunts you down!

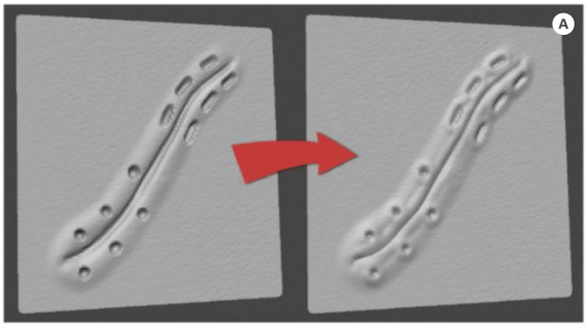
In this article, I'll show how to sculpt and PolyPaint a nasty rough gash held together with whatever the mad scientist could find lying around his lab, using a simple process that can be applied to a host of similarly classic monster features. Real stitches are generally simple, clean and – let's be honest – boring. While exploring ways to sculpt monster-style cuts and sutures, I found one of the most important elements was to let mistakes happen. Monsters aren't generally very clean and tidy, and neither are their doctors. Using loose, quick strokes for the base shape of the cut will add a sloppy, naturally random element. Keeping this in mind throughout the entire process will help take the gross, chunky look of the stitching to the next level of nastiness.

This guide will add another tool to your mental library of features for use with your future characters. Try applying this technique to things like chains piercing a demon's skin to hold his armour in place, or the intersections between a cyborg's organic and technological parts.

You can also choose to follow this tutorial sculpting on a plane as I have, then use ZBrush's GrabDoc feature in the Alpha menu to turn your cut and stitches into an alpha that can quickly be recycled on other characters for ultimate convenience.

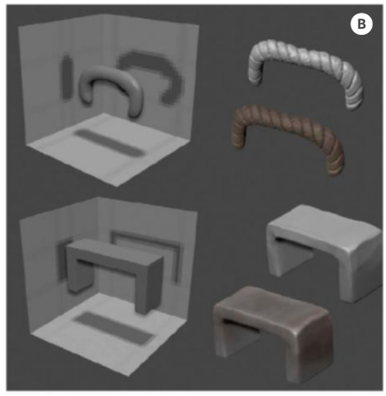
Every character has its own style and story that affects the design of the stitching. Before you start digitally operating on your character, think about how they would have 'wound up' with their wounds, and how they were stitched up. Did they get into a huge chainsaw fight with a robot, creating a jagged, torn gash? Or perhaps they were assembled from pieces of other monsters by an evil surgeon, who used clean cuts and a tight stitch? Is the creature so enraged that some of the giant metal staples have started to pull apart?

Once these basic design elements are established, we're ready to begin.



01 Make the cut

First, choose the shape and location of your cut. Use the Standard brush and hold Opt/Alt to cut a jagged, wandering line across your model. Now use the Pinch brush to close the gash a bit, and the Inflate brush along the edges to give it a puffy, inflamed look. Using the Standard brush with Lazy Mouse turned off, make a series of holes along the cut for the stitches A.



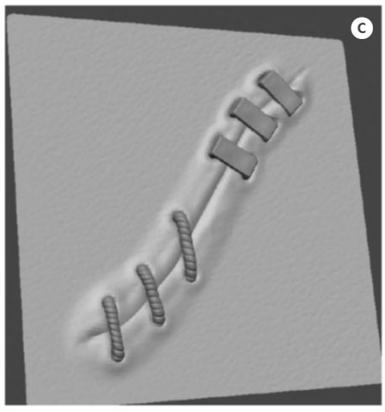
02 Create the stitches

Now we'll create the basic stitch element. I used ShadowBox, but ZSpheres can work just as well, depending on what type of stitching you're creating. Try to finalise the sculpted stitch and PolyPaint as much as possible at this stage, since they'll be duplicated quite a few times, depending on your model. Keep the polycount at the lowest subdivision level as possible so that it's easy to alter for different surface features along the gash B.

Auto Masking brushes

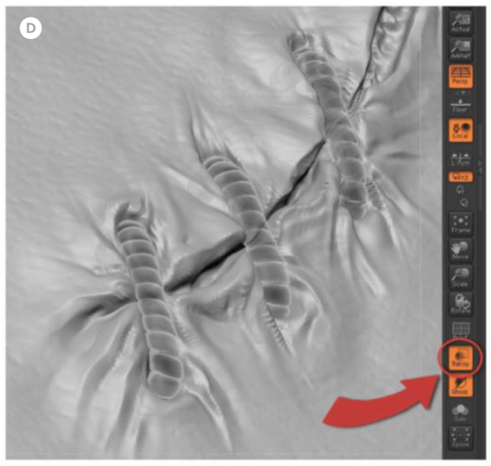
ZBrush 4 includes a Move brush that uses the new Topological Auto Masking mode, but you can use this and other Auto Masking modes for many of the brushes. These features can be found in the Brush menu, under the Auto Masking rollout. My two favourites are the Backface and Topological masks.

The Backface mask is great for working on thin objects, preventing the brush from affecting the other side of a mesh if it's within the brush's radius. The Topological mask, in comparison, affects only the section of geometry you began on, ignoring other pieces of nearby non-contiguous geometry – ie moving only the top lip of a closed mouth.



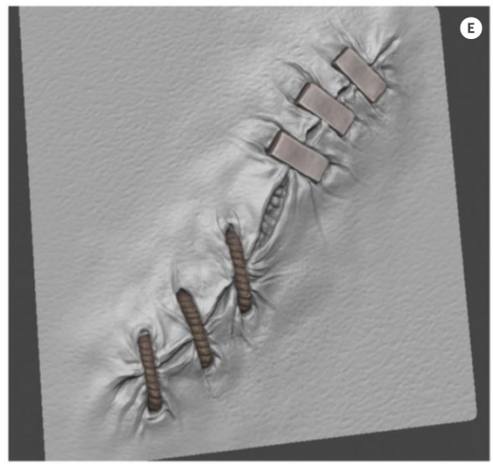
03 Stitch placement

Duplicate the new stitch SubTool and use the Transpose Move, Rotate and Scale tools to align it with the first set of stitch holes along the gash. Always keep your original stitch SubTool in case you need a fresh duplicate; the repeated duplicating and distorting for each new stitch can add up over time. When you place a stitch, let it intersect a little with the skin surface – this overlap will become skin folds later C.



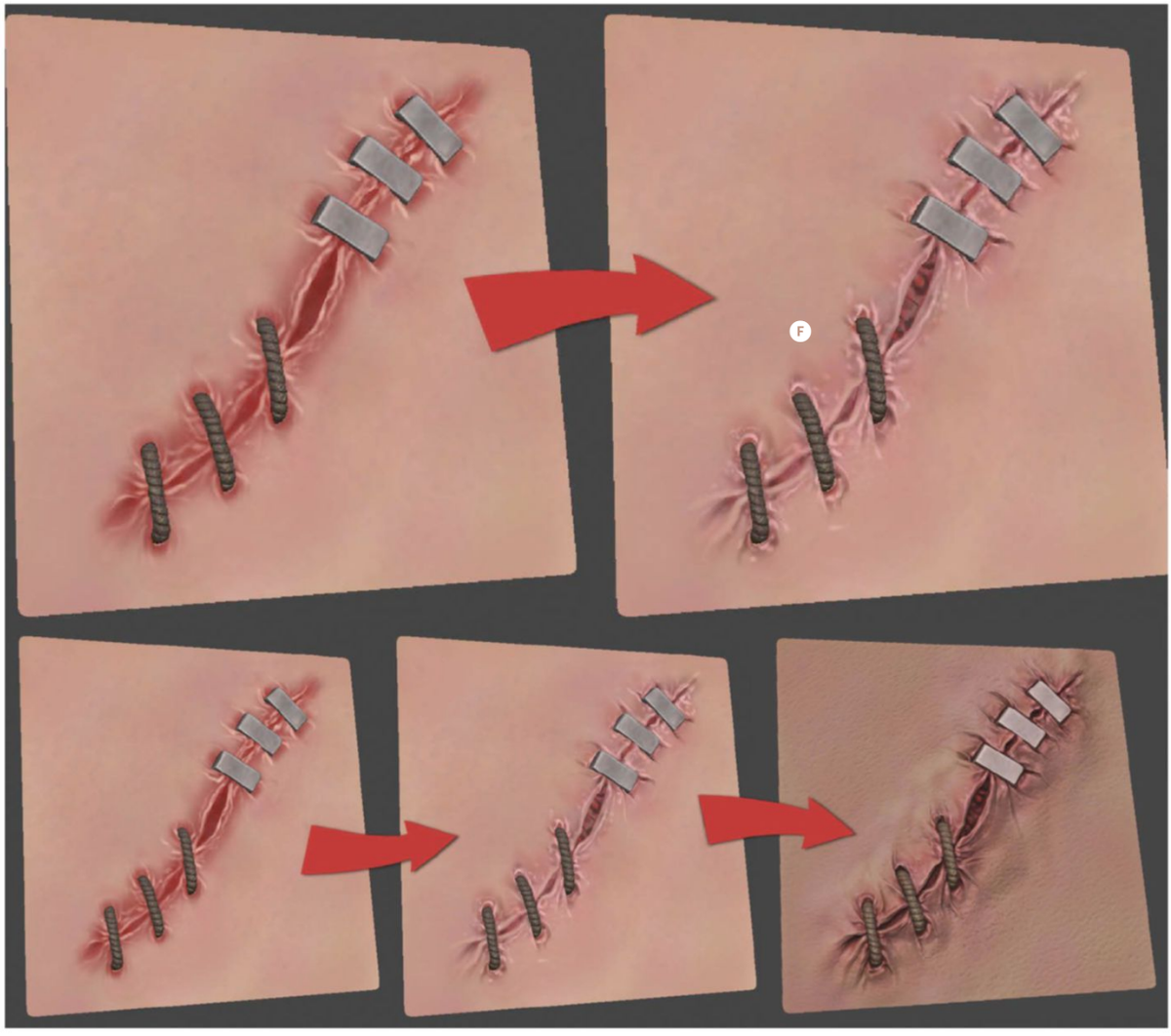
04 Tension lines and skin folds

Next, sculpt the skin around the stitches to add tension where the skin is pulled tight, and folds where the stitching is causing it to bunch up. With the skin SubTool active, click the Transp button in the lower right-hand corner of the viewport to activate transparency. In this mode, your brush will ignore the ghosted SubTools, enabling you to sculpt under and around the stitches easily D.



05 Refine the cut

Now we'll really push the nastiness of the cut we're stitching closed! Pull the edges of the gash together where the stitches cross it, and leave a little opening in between them. Depending on what type of wound you're creating, add some jagged rough shapes along the edges. Use the Move Topological brush to edit one side of the cut without affecting the other to easily tweak the shape of the wound E.



06 Gory PolyPainting

Start by drawing a bloody red colour along the cut – assuming your character has red blood, that is! Use the Smooth brush in RGB mode to blend the surrounding skin colour with the red of the inflamed wound. Along the ridges and bumps, add a light skin tone and keep the darker reds to the crevices and cuts. You can also use the DragRect stroke with an interesting alpha and low RGB intensity to add a sickly quality to the wound. Experiment F!

behind the scenes

3D artists explain the techniques behind their amazing artwork

Artist info

Michael Ingrassia

3DArtistonline

Company website
www.3dta.com

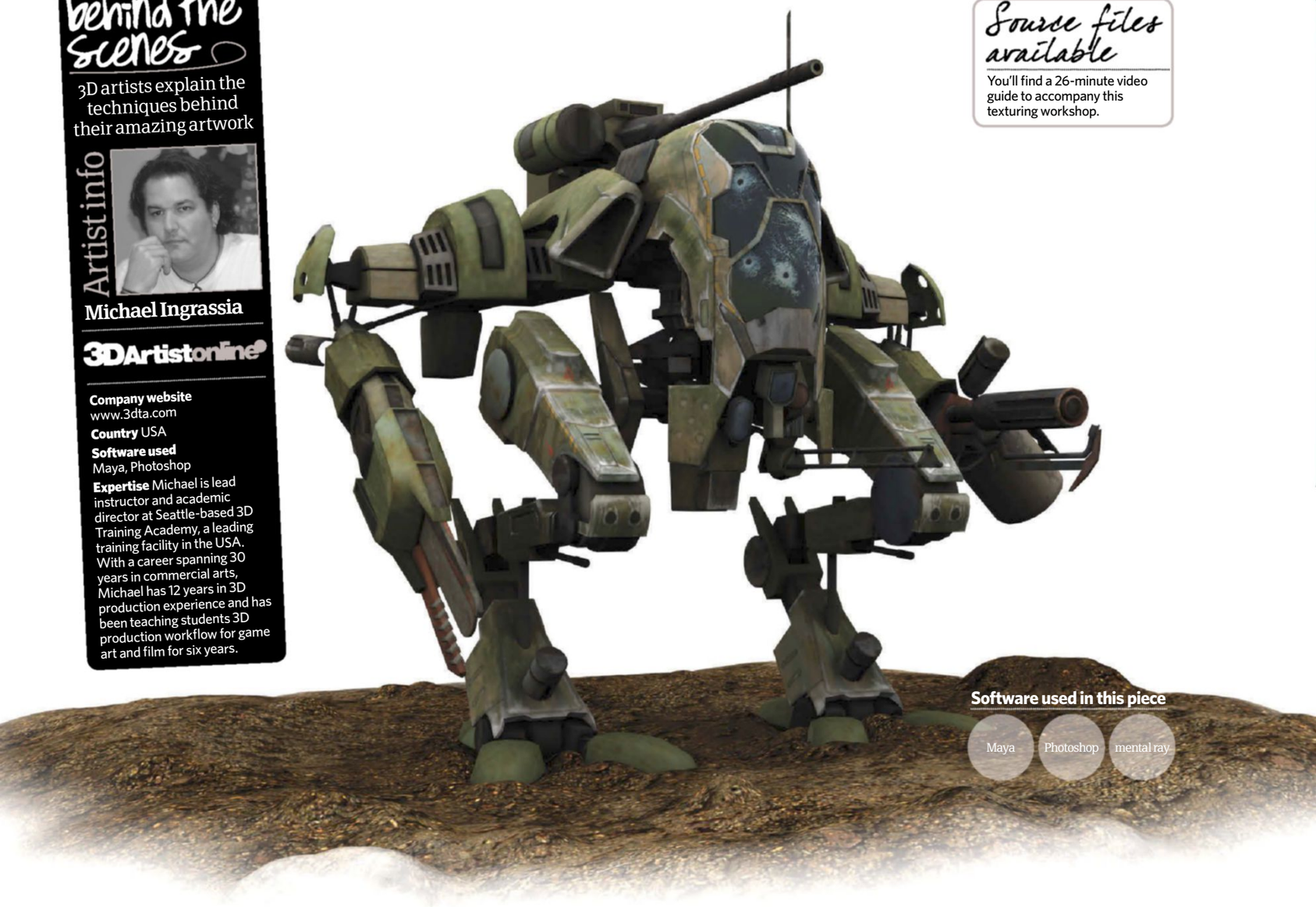
Country USA

Software used
Maya, Photoshop

Expertise Michael is lead instructor and academic director at Seattle-based 3D Training Academy, a leading training facility in the USA. With a career spanning 30 years in commercial arts, Michael has 12 years in 3D production experience and has been teaching students 3D production workflow for game art and film for six years.

Source files available

You'll find a 26-minute video guide to accompany this texturing workshop.



Software used in this piece

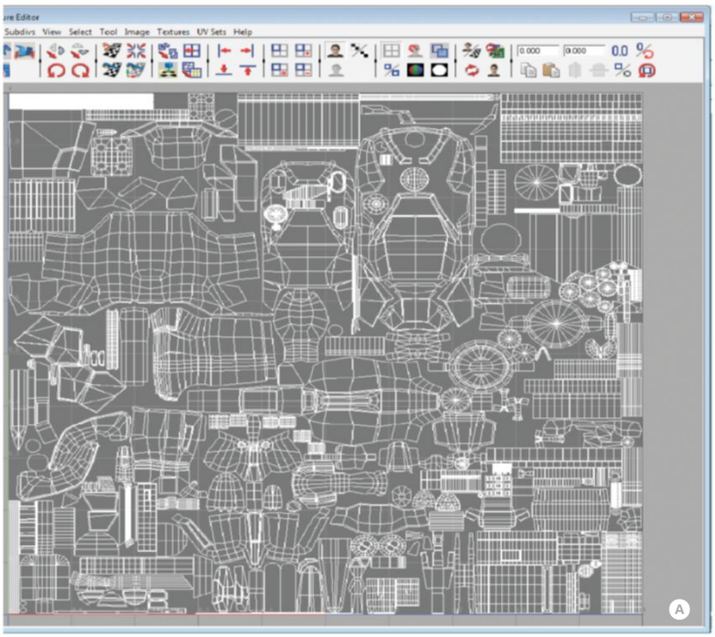
Maya · Photoshop · mental ray

How can I create industrial textures to transform mechanical models into believable assets?

Over the years as a 3D instructor I have consistently come across students who lacked traditional art or strong texture-painting skills. By utilising a variety of rendering tools available in Maya I will demonstrate how you can quickly achieve great results in a relatively short time with impressive results. Even if you use just one of the following techniques I think you'll find it can save you considerable time when creating textures.

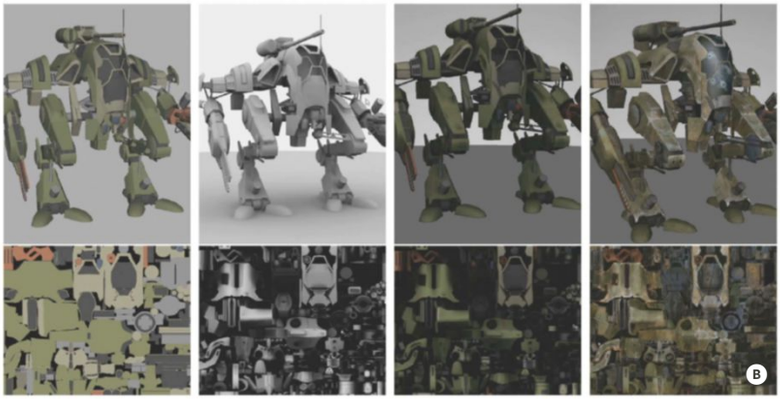
I purposely used Maya 2009 for those of you using slightly older iterations of Maya. Studios tend to be behind a few versions of the most recent programs anyway. For those of you using the latest and greatest releases you won't notice any discernable differences following these steps.

In this workshop I am going to use a mech model from our academy ebook *Tricks & Techniques of Concepting Vehicles*, which is now available at **www.3dta.com**. When you purchase our ebook training you'll receive, as a bonus, this high-quality mech model complete with textures absolutely free. It makes a great learning tool for aiding in both modelling and texturing.



01 Process overview

The processes we'll use to create the texture map will begin with a clean UV layout followed by initial colour block baking. We'll set up a quick mental ray LightDome to generate an ambient occlusion bake for adding necessary shadows. Applying several photo textures such as scratches, rust and dirt/grunge will boost the realism. Finally some simple hand-painting techniques in Photoshop will enable us to add wear and distress to the final texture map A B.

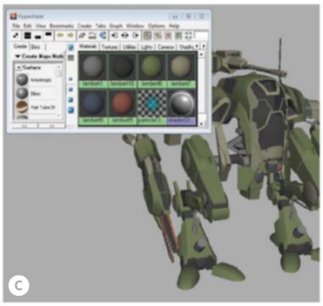


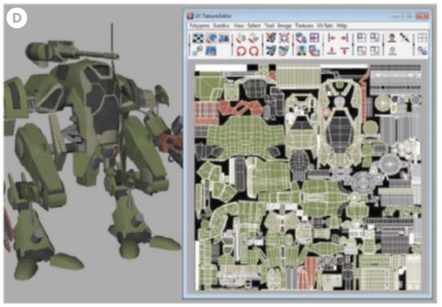
02 Easy colour-blocking method

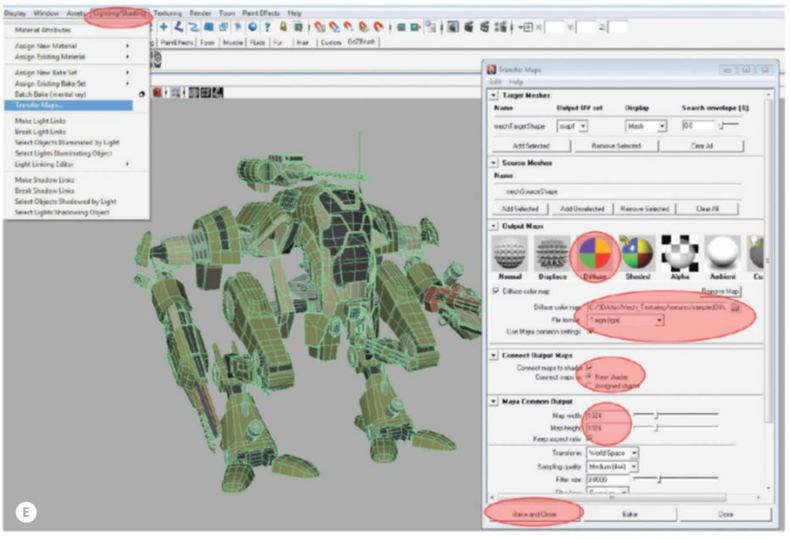
Blocking out solid basic colour before beginning a texture is wise because it will help you to establish a clean canvas for your model and enables you to watch the progress unfold on your 3D model as you add more details to the texture map. In this lesson I am going to show you an easy way to bake a colour 'blocking' map quickly, right inside Maya.

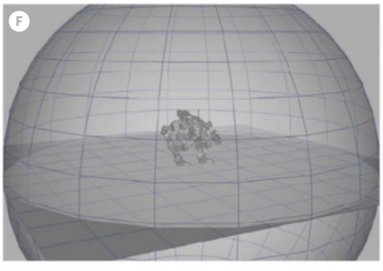
Create five to six Lambert shaders and assign each one a colour from your design's colour palette. Select the appropriate parts or faces of your model and assign each one a Lambert colour. Tip: Applying a dark grey or black colour to 'interior' faces can help to artificially suggest the shadows in final renders. Next duplicate your model (making sure to keep it in the same location). Assign Maya's default Lambert shader to the duplicated model. Now, in Rendering mode, go to the Lighting/Shading menu and select Transfer Maps C D E.

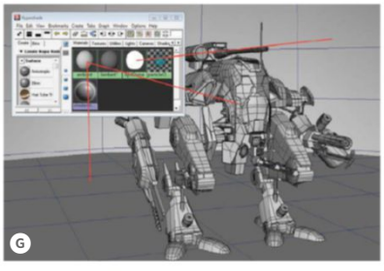
- Select the grey shaded model (Target) and Add Selected to the Target Meshes.
- Select the multi-coloured model (Source) and Add Selected to the Source Meshes.
- Set Output Maps to Diffuse and give your colour map a name and location for the bake.
- Connect Output Maps>New Shader will auto-assign the baked map to your model.
- Finally, set the desired map size and quality. 1,024 x 1,024 at Medium (4 x 4) is a good start.
- Press Bake and Close to begin the Transfer Maps baking process. Allow two to three minutes.





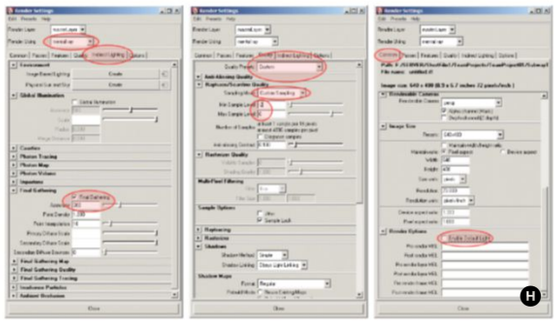


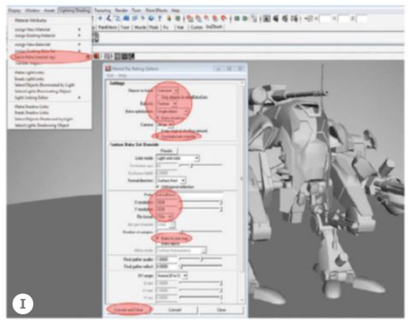


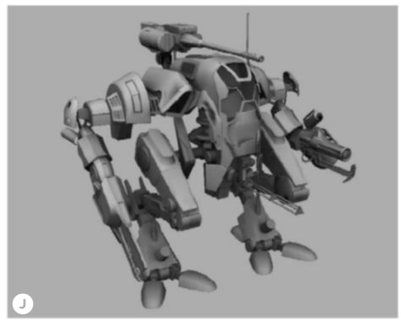


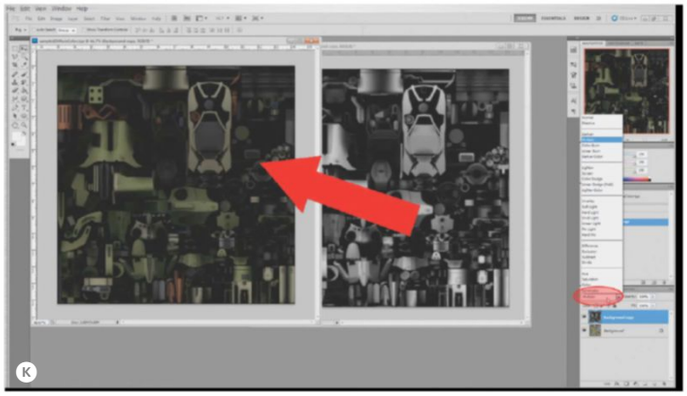
03 Quick mr LightDome

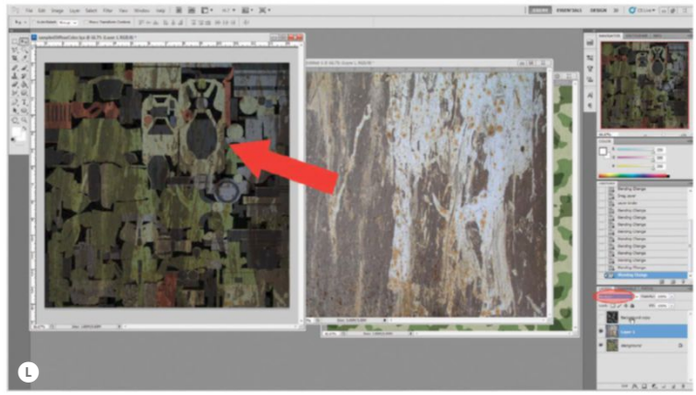
We'll set up a simple ambient occlusion light dome to generate a clean AO bake map. First create a flat poly plane (ground plane) and poly sphere object (light dome). Create two new Lambert shaders in the Hypershade. Adjust both shader colours to white. Adjust one shader's Ambient Color channel to white for illuminating the light dome. Now apply the first white shader called Ambient to both the ground plane and the mech meshes. Apply the illuminated shader LightDome to the poly sphere F G.











04 Effective AO bake

Now we'll set up both the render global setting and Maya's Batch Bake rendering settings. Open Render Globals Editor and set the Render Mode to mental ray. Under the Indirect Lighting tab, check Final Gathering to On and set the Accuracy to 300. In the Quality tab, set Raytrace/Scanline Quality to Custom Sampling. Set Min to -2 and Max to 6. Under the Common tab, in Render Options, uncheck Enable Default Light. Back under the Lighting/Rendering menu select Batch Bake options box to open the panel. With the model selected set the following parameters: H I J

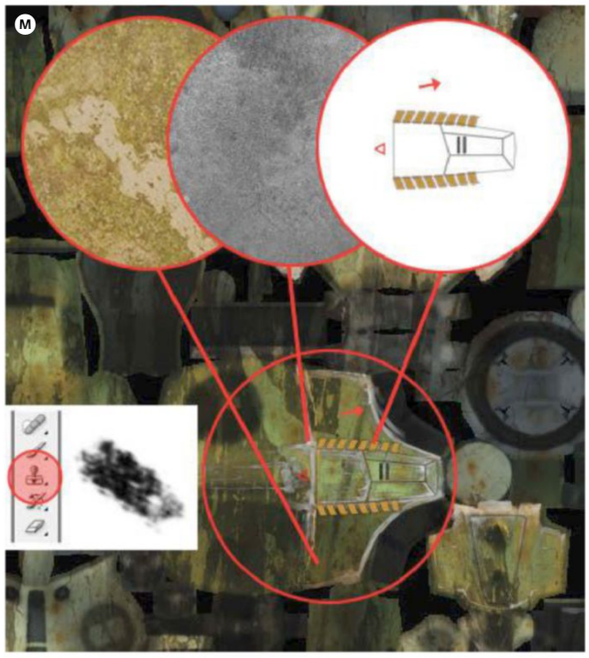
- Objects to bake: Selected
- Bake to: Texture
- Bake optimization: Single Object
- Bake shadows: Check on
- Use bake set override: Check on
- Prefix: Name your map
- X & Y Resolution: Same size as your colour block map (ie 1,024 x 1,024)
- Convert and Close: Begins the baking. Allow up to ten minutes to process.

05 Compiling maps and adding grunge

At this stage you can begin to combine the maps in Photoshop onto different layers. Start with the colour block layer and add the AO map above it. Add a slight Gaussian Blur to the ambient occlusion pass to remove any harsh details. Turn on Multiply blending in the layer filter. To randomise colour and add metal scratches, hop on the internet or your texture library and find a variety of distressed metal, camouflage or stained concrete images that can be used as overlay patterns to help break up solid colour tones and also add imperfections to our war-torn mech machine. Drag any grunge images onto new layers above the colour block and sample the various Filter settings to see which are most appealing. Usually Multiply, Screen, Overlay and Soft Light blending modes tend to give the results with the most impact K L.

06 Applying wear and details

Adding overlays of worn metal or mud/dirt can be achieved rather easily using Photoshop's Clone Stamp tool with a selected brush such as Oil Medium Wet Flow. Open an image of silvery metal next to your texture file. Next choose an area on the metal image using your Clone Stamp and holding Opt/Alt to record the selection. Reduce the Opacity to around 35% to start with and begin brushing in areas where you want the metal paint to look worn off, exposing the bare metal underneath. Having a layer with your UV layout grid will help to discern edges. You can further enhance the effect of the paint by adding an Inner Shadow layer style to create a slight undercut from the painted metal to bare metal edging. Finally add in some hazard stripes and decals such as arrows and warnings to really up the authenticity M.



Summary

I think you'll find these methods not only easy but a more fun way of generating quality textures quickly. To help clarify any steps in the tutorial that may be confusing I've provided a 26-minute video demonstration showing the steps and workflow of this workshop in greater detail with your source files. Please take a moment to check out our website (**www.3dta.com**) and feel free to drop us an email with any questions you may have. Happy texturing!

How can I add lifelike shadows in post?

Photoshop

A common postprocessing task in architectural-visualisation projects is adding in various 2D assets to finish off the image – usually a scattering of people to give a sense of scale to the scene, along with other things like trees, road signs and so on. These will all need shadows to 'ground' them in the image.

Convincing shadows can make or break a postprocessed image, and leaving them out isn't an option. However, getting the angle, colour and general feel of the shadows can become a bit of a pain to do. There is a danger that shadows can look fake or over-emphasised, but it can be hard to pin down why.

Techniques for shadows will vary dependent on the scene, with some scenes being easier to work with. In general, diffused lighting will give a general soft darkening around the asset. The diffused lighting could come either from a series of interior lights (eg an open-plan office space with a repetitive grid of ceiling striplights), or perhaps an exterior scene on a cloudy day, with the clouds diffusing the direct sunlight.

Shadows for these scenes tend to be easier to produce, often just needing a soft-edged brush gently applied to a multiplied layer positioned below the asset in the layer stack. For these, add a very general darkening to the area around the asset, with a more focused darkening near where it meets the ground (around the edges of shoes, for example). Also pay attention to where the asset is positioned in the scene – standing near a wall may require a slight darkening of the wall too.

Trickier to accomplish are shadows created by direct light. A key part to getting them right is to pay attention to the rendered shadows in the scene. What colour are they? What angle are they falling at? Remember to take into account perspective when choosing the angle – although a constant light source will mean all shadows fall in the same direction, a camera's interpretation will show them at different angles on the screen as they converge towards the vanishing point. Overlay a perspective 'grid' layer if necessary based on other shadows in the scene, as I have in image A.

The three steps below should help your shadows to become more convincing. I'll be using Photoshop for this, and will assume you have a basic understanding of the most commonly used tools. The cut-out image here comes courtesy of the kind folks at VYONYX (http://vyonyx.com).

01 Angle & placement

Firstly, create a shadow form. Assuming your asset is a cut-out image on its own layer, make a duplicate layer below and Free Transform it to project along the ground. Whether or not you need to mirror it will depend on the angle of sunlight. Pay attention to where the shadow meets landscape features – you may need to splice several 'shadows' together to get them to fall convincingly over curbs, walls and so on (don't worry if they don't meet perfectly) A.

02 Colour

Temporarily lock the transparency of the layer and fill it with a solid colour. The colour will depend on the temperature of the ambient and diffuse light in the scene – if an exterior day scene, usually a mid grey-blue will do (I used RGB 115,152,177 here). Interior atria or dusk shots might need a warmer yellowy-grey. Change the blending mode to Multiply and tweak the opacity until it matches other shadows in the scene. Use the Hue/Saturation adjustment to make final tweaks to the colour B.

03 Finishing touches

Shadows tend to become more blurred as the distance between them and the object increases: look at the lamppost shadow in the main image. Using a Blur filter, soften the shadow edges further away, leaving the shadow crisp near to where it meets the asset. Finally, distort the shadow based on what it's falling on – shadows on grass tend to be quite choppy, so use the Smudge tool to break down edges where needed C.

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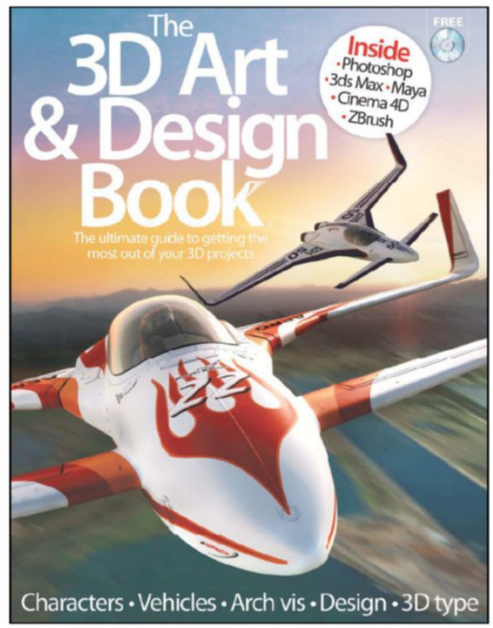

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Published 13 times a year, **3D Artist** delivers the finest tutorials, features and interviews with people working in the industry, in addition to the reviews and what the latest happenings are in the 3D community. Each issue also comes with a free CD that is packed with high value 3D content such as software and models.

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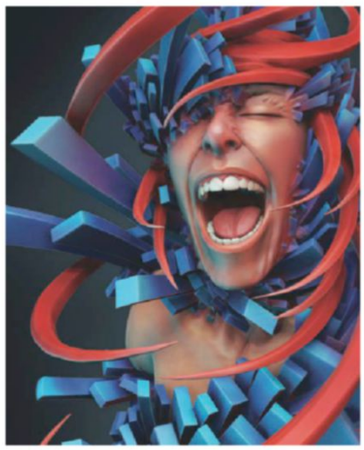

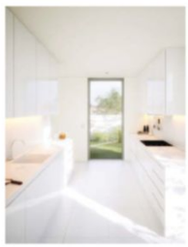

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